THE IRON TRADE REVIEW

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BUYING CHECKED

BY HIGH PRICES ASKED FOR PIG IRON.

Slow Deliveries Cause Foundries to Close.—More Spot Iron Appears.—Tremendous Tonnage of Unfilled Orders of Finished Products.

The inevitable result of very high prices is being shown in a lull of buying in some parts of the country, although this tendency is not manifested in other sections, especially in the east. Municipalities in the market for cast iron are among the first to refuse to place orders at present prices, and an advance of cast iron pipe prices this week will probably result in further postponements of contemplated contracts. Conservative interests do not look with disfavor upon this diminution of new tonnage coming to the order books.

Slow Delivery. The very slow deliveries of pig iron are adding to the troubles of foundrymen, and a number of concerns, particularly in the St. Louis and Cleveland districts, have been compelled to close on account of not receiving adequate supplies. Complaints of consumers concerning deliveries are made with increasing vehemence, and the constant offering of spot iron continues to be a source of irritation to those who are not getting their tonnage on contracts. The railroad situation, patricularly in the south, seems to be growing worse. The principal harvester interest has made a further purchase of foreign pig iron, but the amount of iron available in Great Britain for export is evidently not large enough to furnish much relief to the United States.

Unfilled Orders. The United States Steel Corporation on Sept. 30 had on its books 7,936,884 tons of unfilled orders of all kinds, and during November this tremendous tonnage probably increased approximately 100,000 tons, making over 8,000,000 tons of unfilled orders. Similar conditions prevail in the mills of other interests. At present, however, new buying in some lines is not so active. In structural material the sales of the principal producer for November were about 20,000 tons below the average for twelve months. The demand for heavy rails is not strong, but light rails are selling freely. A very large tonnage of steel bars will be carried over into the new year. Bar iron is strong and important railroad business is pending.

Plates and Sheets. The price of plates is now established at $34 Pittsburg, and $36 is paid in some cases, although the principal producer has not advanced its prices. Steel car manufacturers and lake shipbuilders are piling up plate specifications at the mills and specifications on sheet contracts are also very large. An advance in the price of sheets at an early date is not improbable. An advance of $2 per ton on wire products is announced, and makers are far behind on deliveries. All indications point to extremely heavy spring business in fence wire. The principal producer of tin plate has accepted a large tonnage for second quarter delivery. The shortage of fuel has interfered with operations of many tin plate mills. Inquiry for merchant pipe is strong and an advance of $2 is announced.

Old Material and Coke. The continued mild weather has interfered to some extent with the calculations of dealers in old material, but the market shows little indication of weakness. Coke prices continue high and delivery is much retarded.

LATE RAIL SALES.

New York, Dec. 5.—Late rail sales include the following: Buffalo, Rochester & Pittsburg, 3,500 tons; Northern Electric, 2,000 tons; Oregon Electric, 2,500 tons; Shasta Southern, 12,500 tons; Miscellaneous, 2,000 tons.

MONUMENTAL

WORK OF PRESIDENT TAYLOR AND HIS ASSOCIATES

Reported at the A. S.M. E. Convention.—Record Attendance at First Session.—Henning's Injunction Efforts Fail.

(Special Telegram.)

New York, Dec. 5.—What promises to be the largest meeting ever held by the American Society of Mechanical Engineers opened here tonight with a registered attendance of 770 at the first session. The meeting was held in the Edison auditorium in Twenty-seventh street, and the first business was the reading of President Taylor's address on "The Art of Cutting Metals."

In the past, all matters pertaining to cutting metals in machine shops have been settled by the judgment and personal experience of foremen and skilled mechanics according to the good old law of "rule of thumb." The writer of this paper and several of his friends have spent a large part of their time during twenty-six years in an endeavor to bring many of the elements of machine shop practice into the domain of exact science, and thus to establish the "art" of cutting metals.

In this work they have cut about 800,000 pounds of steel and iron into chips in making from thirty to fifty thousand accurate experiments, costing about $200,000. They have found laws covering the important elements of this art, and have succeeded in obtaining mathematical formulae which accurately express these laws; and finally, after years of work, they have developed a slide rule by means of which the ordinary mechanic can use the knowledge so obtained to increase the daily output of his machine.

In the course of these experiments, several new and surprising discoveries were made, among which the most notable is that of the new high-speed tools, which have revolutionized machine shop practice.

The paper is written for mechanics and shop foremen as well as for scientific men, and in all cases the practical and useful are given preference over the theoretical. There are 250 pages of text and about 140 drawings and tables. Part

(Continued on page 15.)

THE WEEK IN IRON CENTERS.

PITTSBURG.

Advances in Some Finished Lines.—Lull in Pig Iron Buying.

Office of THE IRON TRADE REVIEW, 521 PARK BUILDING, Dec. 5.

The unusually heavy specifications on certain lines of finished material, notably plates, sheets, wire products and steel bars, continue to be the feature of that branch of the trade while on the other hand the scarcity of pig iron and semi-finished material is a story so old that it no longer attracts particular attention except when consumers get to the point where they appreciate they have not covered for their requirements and attempt to buy these materials at the present market prices.

The continued heavy buying of steel bars has placed an enormous tonnage on the books of producers and on new contracts it is doubtful whether deliveries could be secured short of three to five months. Structural material has not advanced and it is not likely to be advanced in price for some months at the present rate of bookings, although new business has improved to a marked degree since the recent advance in steel bars, probably on account of an impression by buyers that all finished lines were going to be advanced. The new business in structurals is for the most part in heavy shapes, although the tonnage is fairly well distributed over the entire range.

Wire products, nails, fence and plain wire advanced in price $2 per ton, effective on Monday of this week, rail splice bars advanced $3 per ton and scrap advanced 50 cents to $1 in many lines. Some bar iron business is being done on the 1.85c base. Aside from these lines, there has been no material change in prices since last week, although another advance is expected in merchant pipe.

The financial statement of the United States Steel Corporation accompanying the dividend check Nov. 30 contains the statement that on Sept. 30, 1906, the unfilled orders on the books of the companies amounted to 7,936,884 tons and this was probably increased by at least 100,000 tons during November, new business exceeding shipments by that amount.

Pig Iron.—The average price of Bessemer pig iron during November was $22.85, delivered Pittsburg, this including representative sales for all deliveries during the month. A few of the big steel making interests have been handicapped of late on account of a shortage in pig iron and one big plant in this district was shut down two days last week because of this. Whether the ruling high prices have discouraged buying or because consumers are pretty well covered for their requirements, prices have remained stationary for the past week and there has been but very little inquiry, either for steel making or foundry irons during the week. Prices are strong and there has been no decline, but the situation is easier and relieved of the strain of the past three months. The present lull in buying is the first since the summer months, the holidays probably having something to do with it, and another solution advanced is that consumers are allowing their stocks to diminish for the annual inventory at the first of the year. Furnaces are making a little better deliveries and the complaint on this score is not as great as it has been. First half iron is pretty well cleaned up and the only new capacity due within the next few months is the Josephine furnace of Corrigan, McKinney & Co., which will be blown in about Feb. 1, and against the production of which a large tonnage of foundry and forge iron has already been sold.

For first half, Bessemer and basic irons are quoted $22 to $23, valley furnaces, and northern No. 2 at $23 to $23.50 valley furnaces. A few additional sales of malleable Bessemer have been made for third quarter and last half deliveries but steel making concerns have not gone that far ahead. Southern No. 2 for prompt delivery is quoted $22.50 to $25, Birmingham, and for first quarter $20 while $18.50 to $19 is being quoted on second quarter southern No. 2. Very little if any foreign iron has been brought into the Pittsburg district. For first half delivery we quote as follows:

Bessemer Valley	22.00 to 23.00
Bessemer, Pittsburg	22.85 to 23.85
No. 1 Foundry, Pittsburg	24.35 to 24.60
No. 2 Foundry, Pittsburg	23.85 to 24.35
Gray Forge, Pittsburg	22.85 to 23.35
Basic, Valley	22.00 to 22.50
Basic, Pittsburg	22.85 to 23.10

Ferro-Manganese. — For December delivery ferro-manganese, foreign, 80 per cent, is a little scarce and $85 delivered Pittsburg is quoted. For delivery after Jan. 1 the price is $80 to $82.50. Imported 50 per cent ferro-silicon is quoted at $105 seaboard and domestic and foreign 12 per cent are both quoted about $36, delivered Pittsburg in carload lots.

Muck Bar.—There has been no change in this commodity, very little muck bar being in the market. Specifications against old contracts are heavy and we quote a nominal market of $36.50 to $37 for all pig metal bar and about $3 less for scrap bar.

Hoops and Bands.—While the new business is not as heavy as it was before the advance, the volume, including specifications is far in excess to the capacity and mills are behind on their deliveries. The market is strong and we continue to quote:

Hoops, in carload lots, 2c; in less than carload lots, 2.10c; bands, 1.60c base, half extras as per standard steel card. Prices f. o. b. Pittsburg.

Skelp.—Producers of skelp are practically out of the market as far as new business is concerned and several of them have been in this condition for a long time past, specifications against existing obligations being the capacity of mills to produce. Iron skelp, is quoted 2.15c to 2.25c and is hard to obtain on account of the comparatively few makers and the heavy demand from regular trade. On light gauges and narrow widths we quote:

Bessemer grooved, 1.70c to 1.75c; sheared, 1.70c to 1.75c; basic, grooved, 1.80c to 1.85c; sheared, 1.75c to 1.80c; iron skelp, 2.15c to 2.25c.

Steel.—The steel supply has improved to a considerable extent and the extreme scarcity that has been the feature for several months past is not as pronounced, although the supply even now is far short of the demands. Soft Bessemer billets are quoted nominally $28.50 to $29 and sheet bars $30. With the price of billets where it is the usual differential between billets and sheet bars has apparently been lost sight of, although in special instances, where the consumer has been hard pressed for an immediate supply as high as $33, mill has been paid. Open-hearth billets are nominally held at $29.50 to $30. A sale of a fair tonnage of open-hearth sheet bars at 50 cents below the pirces quoted is noted, but this was evidently a case where shipments were deferred and a slight sacrifice was made in order to obviate the necessity of storing.

Structural Material.—As was noted last week, there has been a decided

improvement in the structural business from the mill standpoint, specifications being much better and a fair volume of new business for early spring delivery has been placed. There has been no advance in the price of shapes, this being practically the only finished line in which there has been no advance since early in the year. While the heaviest demand in the new business has been for the larger shapes, the range has been fairly well distributed, and mills are in excellent shape to make deliveries. We quote as follows:

Beams and channels, 15-inch, and under, 1.70c; over 15 in., 1.80c; zees, 1.70c; tees, 1.75c; angles from three to six inches inclusive 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Rails and Track Material. — The new business in standard rails was not as heavy during the past week as it was the week before, but about 21,500 tons were placed, most of it for the Pacific coast, about 5,000 tons being for electric traction lines. The fact that this business was placed in Pittsburg is taken as an indication that Colorado and Chicago mills are pretty well filled up and apparently not in shape to make deliveries as required on this business. There has been a heavy inquiry and one or two large tonnage negotiations are pending. Light rails continue in good demand and the new business for the week under review amounted to 1,200 tons. There is a tremendous demand for iron and steel spikes, the best deliveries on new business being April or May. We quote as follows:

Fifty pounds and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 16 pounds, $33; 20 to 45 pounds, $32; angle bars for standard sections, 1.65c; spikes, $2.50 to $2.75 for forward deliveries.

Wire and Wire Nails. — Effective Monday, Dec. 3, an advance of $2 per ton on wire and wire nails was announced. Trade conditions continue in excellent shape, new business is very good, specifications are abnormal and mills are loaded up practically to the full extent of the contract period for which business will be accepted. Fence wire, plain, welded and barb, are in strong demand and that for wire nails exceeds previous records for many years past. Buyers are evidently making preparations for a very heavy spring business and are anticipating their requirements in order to be in position to give prompt deliveries to consumers at the opening of the spring season. We revise quotations as follows:

Wire nails, jobbers' carload lots, $2; retailers' carload lots, $2.05; less than carloads $2.10; painted barb wire $2.15; for jobbers in carloads, retailers in carloads, $2.20; and less than carloads, $2.30, with 30c for galvanizing; plain wire $1.85 for jobbers and $1.90 by carload.

Tin Plate.—This is the usual off season for new business in tin plate, but new buiness is being received by producers in a fair volume, and although no official announcement has been made that the leading interest is ready to quote on second quarter business, a large tonnage has been tendered and accepted. A shortage of fuel, both coal and gas, the latter on account of cold weather, has interfered with operations. We continue to quote:

Coke tin plate, 100-pound basis, 14 x 20, $3.90 f. o. b. mill, Pittsburg district. Terms, 30 days, less two per cent for cash in 10 days.

Merchant Pipe.—There is an inquiry in the market for 140 miles of 10 and 12 inch line pipe for the Kansas gas belt and it will probably be closed this week. An advance of $2.00 per ton on steel pipe was announced effective Dec. 5. Business continues to run about evenly with the past two months and is uniformly good, with some inquiries being turned aside on account of delivery conditions. Two to three months is the average delivery on the choice business. We quote the following official discounts, for consumers' carloads, jobbers' discount being 78 basing, base sizes and 5:

	Steel		Iron	
	black	galv.	black	galv.
⅛ to ¼ inch	68	52	65.5	49.5
⅜ inch	70	56	65.5	49.5
½ inch	72	60	68.5	57.5
¾ to 6 inches	76	66	73.5	63.5
7 to 12 inches	71	56	69	54
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	61	49	58.5	46.5
½ to 4 inches	68	56	65.5	53.5
4½ to 8 inches	64	52	61.5	48.5
Double extra strong plain ends, ⅛ to 8 inches	57	46	53.5	42.5

Boiler Tubes.—Locomotive boiler tubes continue in very heavy demand and several of the railroads have come in with their requirements for a good part of next year. The demand of locomotive builders in the way of specifications is heavy. We quote:

Boiler tubes.	Steel	Iron
1 to 1¼ inches	50	45
1½ to 2¼ inches	62	45
2½ inches	64	50
2¾ to 5 inches	70	57
6 to 13 inches	62	45

Less than carloads two points less.
2½ inches and smaller, over 18 feet, 10 per cent, net, extra.
2¾ inches and larger, over 22 feet, 10 per cent. net, extra.

Merchant Bars.—The continued volume of new business in steel bars is the surprising feature of the market in finished lines, and this has continued almost without abating, even after the announcement of the $2 advance made a little over two weeks ago. If contracts now on the books are fully specified, it will require full operation until the middle of next year. The minimum market is 1.60c base Pittsburg on steel bars. On iron bars the minimum is 1.80c, Pittsburg on the most desirable business and 1.85 in less than carload lots. We quote:

Common iron bars, 1.80c in carload lots, 1.85c in less than carloads; Bessemer steel bars, 1.60c, plow and cultivator, 1.60c, net; channels, angles, zees, tees, under three inches, 1.70c, all f. o. b. Pittsburg. The following differentials are maintained on steel: less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size 0.30c advance. Cold rolled and ground shafting, 50 per cent off in carload lots, and 5 per cent off in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c, sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. The price of planished and machine straightened tire is 1.80c, base, half tire extras. Iron finished tire up to 1½ inch by ½ inch, 1.75c base half extra, tire list. Iron tire 1½ inch by ½ inch and over to be sold on regular bar basis of 1.60c base, half extras, steel card.

Sheets. — The extremely heavy specifications and the large volume of new business has been out of the ordinary, even for the busy time of the year, and producers have found no difficulty whatever in disposing of their product at the top of the market. The demand has not let up a particle and the leading interest as well as independent mills are loaded up and in some instances where quick deliveries can be made slight premiums are secured. There has been no change in prices and we quote:

Black steel sheets, one pass, cold rolled: Nos. 11-12, 2.20c; Nos. 13-14, 2.25c; Nos. 15-16, 2.30c; Nos. 17-21, 2.35c; Nos. 22-24, 2.40c; Nos. 25-26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 29, 2.75c; No. 30, 2.85c; galvanized, Nos. 10-11, 2.55c; Nos. 12-14, 2.65c; Nos. 15-16, 2.75c; Nos. 17-21, 2.90c; Nos. 22-24, 3.05c; Nos. 25-26, 3.25c; No. 27, 3.45c; No. 28, 3.65c; No. 29, 3.90c; No. 30, 4.15c. Corrugated roofing, $1.85 per square for No. 28 painted, 2½ inch corrugation and $3.15

per square No. 26 galvanized, 2½ inch corrugation. Blue annealed sheets, No. 10 and heavier 1.80c; Nos. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c.

Plates.—The steel car companies and the lake ship yards are sending in the heaviest specifications, with the pipe makers probably second and the demands being made by these interests are tremendous. The new 1.70c base is the market. Although the leading interest has not announced the advance, it is so far filled up that no further business is being sought and it is doubtful whether it would be accepted for deliveries much before the middle of next year at any price. We quote:

Tank plate ¼-inch thick, 6¼ to 100 inches, 1.70c f. o. b. mill, Pittsburg. Light plate schedule, No. 10, 1.80c; Nos. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c. Extras on the regular plate schedule are as follows per 100 pounds: boiler and flange steel plates 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than four inches in width at ends, narrowest end not being less than 30 inches, 0.10c; complete circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gauges under ¼-inch to and including 3-16-inch plates on thin edges, 0.10c; under 3-16 inch to and including No. 8, 0.15c, under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Old Material.—The high prices asked for scrap still prevail, but from the amount sold by dealers to other dealers an inclination to dispose of at least a part of the big stocks being held in yards at present prices is evident and the situation is a trifle easier, in the matter of obtaining scrap only, not in prices. The railroad lists just out are only ordinary and do not show an effort on the part of the railroads to clean up before snow falls, this evidently having been done some time ago when prices began to soar. We quote as follows, Pittsburg district: Heavy melting scrap, $19.50 to $20; re-rolling rails, $21.50 to $22; bundled sheet scrap, $16 to $16.50; iron axles, $30.50 to $31; old car wheels, $22 to $23; old iron rails, 25 to $26; No. 1 wrought scrap, $21 to $21.50; low phosphorus scrap, $22.50 to $23; machine shop turnings, $14.50 to $15; axle turnings, $16 to $16.50; cast borings, $12 to $12.50; No. 1 cast scrap, $19.50 to $20.

Coke.—During the past week the Frick Coke Co. bought the output of another plant in the Connellsville region for the year, amounting to about 5,000 tons a month. Furnace coke for spot shipment is scarce and each week is becoming scarcer for delivery through the winter months. The inquiry during the past week has not been heavy, as practically all furnace interests have covered for at least a good part of their requirements. We quote on standard Connellsville furnace coke for spot shipment $3.50 to $3.60 and for the first six months of next year $3.35 to $3.50; and on contract for the year $3.10 to $3.25, ovens. On foundry coke $3.85 to $4 on contract and $4 to $4.25 for shipment prior to April 1. As noted last week some foundry coke has sold at $4.50.

CHICAGO.

More Purchases of Foreign Iron.—Heavy Specifications.

Office of THE IRON TRADE REVIEW, 1362 MONADNOCK BLOCK, Dec. 4.

An advance of $4 a ton in plates has been made by a Pennsylvania producer, following an active buying movement in this product. The leading interest still adheres to the 1.60c schedule, however, but being unable to take on further tonnage by reason of its present heavy obligations, its position is without particular weight. The minimum price for any delivery in the first half asked by producers able to guarantee delivery is 1.70c Pittsburg, ranging from this to 1.80c, according to the obligations of the seller.

Interest still centers in the foreign pig iron purchases of the International Harvester Co., which have been increased to a total of 12,000 tons. All of this metal will be delivered at Chicago, and will be largely used in the manufacture of export machinery. Quotations on southern and northern iron are without change. The proposed advance in the freight rates between Chicago and southern points, effective Jan. 1, will result in an increased cost of all deliveries after that date of 25 cents a ton.

Specifications for finished material continue very heavy. New tonnage is also brisk, especially for the lighter shapes. Bar iron grows in strength. Some large transactions are pending for this product, the most notable being the inquiry from the Illinois Central for 7,000 tons. Advances are noted in cast iron pipe and car wheels.

Pig Iron.—The International Harvester Co. has purchased a total of 12,000 tons of British pig iron for December and January shipment. The first contract for 3,500 tons was announced in our issue of last week, but since that time an additional 8,500 tons have been ordered. Another large purchase is under consideration, and if the British market does not rise too high, the order will be placed. On this import iron, the company has enjoyed a through freight rate from Glasgow to Chicago of $4 a ton, but the proposed change in the New Orleans schedule Jan. 1, withdrawing the reduced rate allowed on import consignments, will lessen this advantage. It is announced also that an increase of 25 cents a ton will be made Jan. 1 in the Virginia freight rate, or from $2.85 to $3.10 and on Feb. 1 an increase of 25 cents a ton will be made in the rate from Birmingham and all other southern points to Chicago, making the Birmingham rate to Chicago $4.15. There is a good inquiry in the local market for spot iron, as well as for forward requirements. Southern No. 2 foundry for December shipment can be had on the basis of $22.00 Birmingham; for January delivery, $21; February, $20.50; March, $20 and for any delivery in the second quarter the minimum is $18.50 Birmingham. Nothing can be obtained from northern furnaces for spot shipment, and only a limited tonnage is offered for the first quarter. Southern silvery irons continue very scarce, four per cent silicon commanding $23.50 Birmingham. Stronger grades are $1 a point higher. The inquiry for second and third quarters for northern and southern irons is both brisk and heavy. The largest transaction pending is for 15,000 tons of malleable Bessemer for the last half. For the last half, one southern seller is quoting on the basis of $17 Birmingham for No. 2, and on five per cent silicon for the same delivery $19.50 Birmingham. Our quotations for the first quarter are as follows:

Lake Superior charcoal	$26.00 to 26.50
Northern Foundry No. 1	26.00 to 26.50
Northern Foundry No. 2	25.50 to 26.00
Northern Foundry No. 3	25.00 to 25.50
Northern Scotch Foundry	26.00 to 26.50
Ohio Strong Softeners No. 1	26.30
Ohio Strong Softeners No. 2	25.80
Southern Foundry No. 1	25.40 to 25.90
Southern Foundry No. 2	24.90 to 25.40
Southern Foundry No. 3	24.40 to 24.90
Southern Foundry No. 4	23.90 to 24.40
Southern No. 1 Soft	25.40 to 25.90
Southern No. 2 Soft	24.90 to 25.40
Southern Gray Forge	23.90 to 24.40
Southern Mottled	23.40 to 23.90
Southern Silveries (4 per cent to 6 per cent Silicon	27.40 to 29.90
Jackson Co. Silveries, 8 to 10 per cent Silicon	31.40 to 33.40
Malleable Bessemer	25.50 to 26.00
Standard Bessemer	25.50 to 26.00

Billets and Rods.—There continues a good demand for intermediate steel

products. Only a few inquiries, however, result in orders because of the high prices that prevail. Deliveries on contracts are slow the pressing requirements of fabricating mills taking the bulk of the output of local furnaces. Wire rods are without change at $35 Pittsburg for either open-hearth or Bessemer. Forging billets are quoted from $36 to $37 Chicago, according to delivery.

Iron and Steel Bars. — Little new business for steel bars is coming forward. Specifications, however, are in the proportion of an avalanche and it will be months before mills can catch up on same. Every producer will carry over into the new year a large undelivered tonnage. Demand for bar iron has increased with the growing congestion of steel. Prices are very firm, and the prospects that 2c iron will rule before the end of the year are very strong. Several large contracts are under negotiation, the principal one being for 7,000 tons for the Illinois Central railway. Most of the new tonnage offered is for delivery in the first half, but because of the probability that higher prices will obtain in the new year, local interests are adverse to adding heavily to their present obligations. We quote carload lots, mill shipments, as follows:

Bar iron, 1.76½c: Soft steel bars and bands, 1.76½c, half extras; soft steel angles, less than 3 x 3, 86½c; hoops, 2.16½c base. full extras; old rail stock, 1.70c. We quote bar iron from stock, 2.20c, full extras; sofe steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛ inch and larger, $2 per 100 pounds base; 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $1.85 to $1.95 half extras; soft steel hoops, 2.40c to 2.50c full extras. Other sizes not mentioned above, $2 per 100 pounds base plus half extras.

Sheets.—Deliveries from mills are very slow due to the congestion of business on their books. Specifications continue active and new tonnage shows a steady increase. Jobbers' stocks are depleted rapidly as a result of the heavy demand on their resources, and it is with difficulty that these can be replenished.

In not a few instances, local distributors have had to buy in the open market in order to complete their lines. Prices are firmly maintained as follows:

Black sheets, Nos. 8, 9 and 10, 1.85c Pittsburg; No. 28 gauge, 2.60c Pittsburg. Galvanized sheets No. 28 gauge 3.65c Pittsburg. Freight to Chicago 16½c per 100 pounds. Jobbers' prices on less than carload lots from store are as follows: Black sheets, No. 10, 2.20c to 2.30c; No. 12, 2.25c to 2.35c; No. 14, 2.30c to 2.40c; No. 16, 2.40c to 2.50c; Nos. 18-20, 2.70c to 2.80c; Nos. 22-24, 2.75c to 2.85c; No. 26, 2.80c to 2.90c; No. 27 2.85c to 2.95c; No. 28, 2.95c to 3.05c; No. 30, 3.35c. Galvanized sheets, Nos. 10 to 20, 3.25c to 3.35c; Nos. 22 and 24, 3.40c to 3.45c; No. 26, 3.60c to 3.70c; No. 27, 3.80c to 3.90c; No. 28, 4c to 4.10c; No. 30, 5.20c to 5.30c.

Plates.—A Pennsylvania independent mill announces an advance of $4 a ton above the official schedule of 1.60c Pittsburg, or to 1.80c. The leading interest still adheres to the former price, but it is prevented from taking on much tonnage by the heavily oversold condition of all its plants. A large volume of business was placed with mills in the week under review on the basis of 1.60c, one concern taking 10,000 tons, nearly all of which is for delivery in the first half of 1907. All those mills in position to make deliveries are asking 1.70c Pittsburg, excepting the firm mentioned above, which is quoting $2 above this price. Jobbers' prices are very firm, and there is talk of an early advance. We quote as follows:

Tank steel, ¼-inch and heavier, up to 100 inches wide, 1.70c to 1.80c Pittsburg base. For extras see Pittsburg report. Freight rate to Chicago is 16½c per hundred pounds.

Jobbers' prices for shipment from local stocks are as follows: Tank steel ¼ inch and heavier, up to 72 inches wide, 2c to 2.10c; 72 inches up to 96 inches wide, 2.10c to 2.20c; 3-10 inch up to and including 60 inches wide, 2.10c to 2.20c; 3-16 inch, 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.15c to 2.25c; flange steel, 25c extra; heads, 25c extra.

Structural Steel. — Nothing of importance has developed in the past week. Specifications are heavy, but new tonnage is light. The only large job on which figures are being taken is the new power house for the Chicago and Milwaukee Electric railway, for which 2,500 tons will be required. Prices are without change as follows:

Beams and chanels, 3 to 15 inches inclusive, 1.70c Pittsburg. For extras see Pittsburg report. Freight rate from that city to Chicago is 16½c per 100 pounds. Quotations from store are as follows:

All angles, three inches and larger, including six inches, $2.05 to $2.10 per 100 pounds; angles over six inches, $2.15 per 100 pounds base; beams, three inches to 15 inches, inclusive $2.05 to $2.10 per 100 pounds base; channels, three inches and larger, $2.05 per 100 pounds base.

Rails and Track Supplies.—A number of small contracts for standard sections are pending, the closing of which hinge entirely on the delivery question. Nothing of large moment has come up during the week. Specifications are strong for light rails and track supplies, and because of the crowded condition of mill order books deliveries are slow. We quote as follows:

Bessemer rails, $28; open-hearth rails, $29; light rails, Bessemer, 30 to 45-pound sections, $32; 25-pound, $33; 20-pound, $34; 16-pound, $35; 12-pound, $36, and lighter sections down to 8-pound, $42.50, all f. o. b. mill. Track supplies vary in price according to quantity and delivery. Angle bars in large lots are quoted 1.50c to 1.75c; for smaller quantities, 2.25c to 2.75c; spikes, large lots, 2.10c to 2.25c; for smaller quantities, 2.50c; bolts, large lots, 2.65c to 2.75c; smaller lots, 2.85c with square nuts, and 3c with hexagon nuts.

Merchant Steel.—Since the advance in steel bars and the nominal establishment of a higher schedule on plates, shafting, which is still unchanged, has perceptibly strengthened. Jobbers and consumers are contracting with greater freedom than at any time in several months past, covering for requirements in the new year. Specifications for the implement and special shapes listed below continue very heavy. We quote as follows:

Planished or smooth finished tire steel, 1.96½c; iron finish, up to 1½ x ½ inch, 1.91½c; iron finish, 1½ x ½ inch and larger, 1.76½c, base; channels for solid rubber tires, ¾ to 1 inch, 2.26½c, and 1⅛ inch and larger, 2.16½c; smooth finished machinery steel, 2.01½c; flat sleigh shoe, 1.81½c; concave and convex sleigh shoe, 2.06½c; cutter shoe, 2.35c; toe calk steel, 2.31½c; railway spring, 1.96½c; crucible tool steel, 6½c to 8c, with higher prices asked on special grades. Shafting is very strong and an advance is expected. Quotations are without change at 50 per cent off in car lots and 45 per cent in less than car lots, in base territory.

Merchant Pipe.—The open weather that prevails facilitates the movement of this product. Mills are keeping pace with their specifications and prompt deliveries can be obtained.

Prices are firmly maintained on the following basis: Chicago discounts, car lots, ¾ to six-inch steel pipe, 77.35; galvanized, 67.35. From store in small lots, Chicago discounts are 74½ to 75 per cent discount on the base sizes.

Cast Iron Pipe. — The increasing cost of pig iron has necessitated another advance in the cast pipe schedule. The new prices are as follows, and are for Chicago delivery, carload lots: 4 inch water pipe, $37 to $38; 6, 8, 10 and 12 inch, $36 to $37; over 12 inch, $35 to $36; gas pipe $1 a ton higher.

Boiler Tubes.—No change is noted in the local situation. Jobbers' report a brisk movement from their stocks and that prices are very firm. The congestion of orders at mills coupled with the steel and car shortage is retarding deliveries, and distributors are experiencing difficulty in replenishing their stocks. Prices are without change as follows: 2¾ to five inches, steel, 68.35; iron, 55.35; seamless, 2¾ to 4½, 50.85. Less than carload lots from store, base sizes, are 60 off for steel; 47½ for iron, and 42½ for seamless tubes.

Wire Products.—There appears no diminution in the demand or the consumption of wire materials. Sales during November were equal to those of the preceding month as a result of the mild weather, and from present indications it is expected no falling off will be felt in December. Mills are still considerably behind their orders, and until the supply of steel and cars increase no improvement is expected. Prices are very firmly maintained. We quote local prices to jobbers as follows:

Wire nails, $2.05; painted barbed wire, $2.20; galvanized barbed wire, $2.50; smooth annealed wire, $2.20; polished staples, $2.20; galvanized staples, $2.45. Carload lots to retailers', five cents higher; less than carload lots, 15 cents higher.

Coke.—The only demand felt in the local market for coal is for "filling-in" lots. Deliveries into this market are very slow owing to the car-shortage at producing points. For spot shipment, premiums of 25 to 75 cents a ton are asked. Nominal prices for forward delivery are $4 to $4.25 ovens, whether for Connellsville or Virginia brands. By-product coke is held at $6.65 to $6.90 Chicago.

Old Material. — The mild weather that prevails is upsetting the calculations of many dealers. While the market is without any noticeable change as to price, the large stocks that are being carried and the limited demand for them have created a disposition to allow small concessions rather than lose a sale. This may be an individual characteristic rather than general, but nevertheless it is not without its influence on the market. The only advance this week is in car wheels, and this was occasioned by the sharp demand and marked scarcity of that product. The local price is now $24.50 to $25.00, the advance being 50 cents. Demand for cast scrap is not as insistent as formerly, and prices of that material are stationary. We quote as follows, gross tons being given in the first paragraph:

Old Steel Rails (4 feet and over)	$20.50 to 21 00
Old Steel Rails (less than 4 feet)	19.50 to 20 00
Old Car Wheels	24.50 to 25.50
Old Iron Rails	28.00 to 28.50
Relaying Rails, subject to inspection	29.00 to 30.00
Frogs, Switches and Guards	18.50 to 19.00
Heavy Melting Steel	17.50 to 18.00
Mixed Country Steel	15.00 to 15.50

We quote net tons, as follows:

No. 1 R. R. Wrought	$18.00 to 18.50
No. 2 R. R. Wrought	17.00 to 17.50
Shaft[illegible]	19.00 to 19.50
Dealers' [illegible]ge No. 1	13.50 to 14.00
Wrought Pipe and Flues	13.00 to 13.50
No. 1 Cast, 150 pounds and less	17.50 to 18.00
No. 1 Mill	10.50 to 11.00
Mixed Busheling (No. 1 & No. 2)	13.00 to 13.50
Country Sheet	9.00 to 9.50
No. 1 Boilers Cut	12.50 to 13.00
Boiler Punchings	16.00 to 16.50
Iron Car Axles	26.50 to 27.00
Steel Car Axles	23.00 to 23.50
Iron Axle Turnings	11.00 to 11.50
Cast Borings	9.00 to 9.50
Mixed Borings, etc.	9.00 to 9.50
Machine Shop Turnings	11.00 to 11.50
Railroad Malleable	18.00 to 18.50
Agricultural Malleable	17.00 to 17.50
Stove Plate and Light Cast Scrap	14.00 to 14.50
Old Iron Splice Bars	22.00 to 22.50

CLEVELAND.

Large Foundry Closed Owing to Iron Shortage.—Effects of High Prices.

Office of THE IRON TRADE REVIEW, Browning Building, Dec. 5.

Iron Ore.—Two important interests, which entered the market for tonnage during the past week and did considerable chartering, have practically settled the ore rate for next season on the same basis as has prevailed during the season just ending. This calls for 75 cents from the head of the lakes, 70 cents from Marquette and 60 cents from Escanaba. The Pittsburg Steamship Co. has not as yet entered the market for tonnage. The large number of new boats which will be ready for service at the opening of navigation makes it certain that there will be ample capacity for the increased needs of 1907. The extremely cold weather prevailing throughout the ore regions, with the resultant frozen condition of the ore, has reduced shipments to a very large extent, a number of boats having been held at upper lake ports for from 10 days to two weeks. Good weather prevailed at the opening of the present week, but a cold wave is predicted and the December movement is certain to be small.

Complete returns of the ore movement from upper lake ports for November are not yet obtainable. Incomplete information, however, indicates that the total will be in the neighborhood of 3,500,000 tons, somewhat larger than in 1905, but still not showing the increase made by other recent months. This brings the season's total to Dec. 1, up to about 36,750,000 tons, with the probability that some 500,000 tons will be added by the close of navigation.

There is practically no selling of ore at present. Based on the reduced iron content recently established, prices for next season are quoted as follows: Old Range Bessemer, $5.00; Mesabi Bessemer, $4.75; Old Range non-Bessemer, $4.20; Mesabi non-Bessemer, $4.00.

Pig Iron.—The foremost feature in this district is the difficulty in securing iron, due largely to inadequate car and motive power facilities and, it is intimated, to heavy spot iron sales, as well. This is particularly acute in the case of southern iron, one large local interest, which was obliged to close one of its shops for five days last week, not having received iron which should have been delivered in July. This is an extreme case and northern interests generally are able to keep their customers supplied in a more or less satisfactory way, though a furnace with deliveries up-to-date is a rarity. The effect of the steady advance of iron to this present level is beginning to make itself felt. The cast iron pipe industry, for instance, is certain to suffer, as much improvement work which had been contemplated, especially by municipalities, will be abandoned or postponed. Pipe has made a number of advances of late and is now selling locally at $36 foundry for four-inch. Selling of pig iron for the last half of 1907 is continued by a few local interests, while others are declining quotations for that period; one large producer, which found its offering eagerly snapped up, has retired from the market. Prices are unchanged, and we quote first half delivery, f. o. b. Cleveland, as follows:

Bessemer	$21.85 to 22.85
No. 1 Foundry	22.50 to 23.50
No. 2 Foundry	22.00 to 23.00
No. 3 Foundry	21.00 to 22.00
No. 2 Southern	22.00 to 22.50
Gray Forge	21.00 to 21.00
Gray Forge, Southern	18.00 to 18.50
Lake Superior charcoal	25.00 to 26.00

Coke.—The car supply shows no improvement, though it is expected that better conditions will prevail with the close of navigation. Foundry coke is

selling readily at $4 ovens, certain makers securing 50 cents above that figure. Furnace coke is scarce at $3.50 ovens.

Finished Materials.—The recent advance in plates has been well received, and considerable business is being done on the new basis. Structural materials can be secured from certain mills in from three to six weeks, but other lines are much stronger, and both new orders and specifications are heavy. Iron bars are selling on contract at 1.85c Cleveland, with jobbers asking 1.95c. Local mills are unable to keep up with the volume of business. Forging billets for quick shipment are quoted as high as $41 Cleveland.

Old Materials.—The market is strong, noticeably in cast iron, old car wheels and heavy steel. Pennsylvania Lines East are out with a list aggregating about 15,000 tons; Pennsylvania Lines West and the Erie also announce good sized lists. We quote Cleveland delivery, gross tons in the first paragraph, as follows:

Old iron rails	$27.00 to 27.50
Old steel rails (over 6 feet)	20.00 to 20.50
Old steel rails (under 6 feet)	19.00 to 20.00
Old car wheels	21.00 to 21.50
Steel boiler plate	16.00 to 16.50
Steel axles	22.00 to 23.00
Malleable iron (railroad)	19.50 to 20.00
Malleable iron (agricultural)	15.50 to 16.00
Heavy steel	17.75 to 18.25
Country mixed steel	15.50 to 16.00

We quote net tons as follows:

No. 1 R. R. wrought	$19.00 to 19.50
No. 1 busheling	15.50 to 16.00
No. 1 machine cast	19.50 to 20.00
Iron axles	26.00 to 27.00
Axle turnings	13.50 to 14.00
Wrought turnings (free from cast)	12.00 to 12.50
Grate bars	14.50 to 15.00
Pipes and flues	15.00 to 15.50
Tank iron	12.50 to 13.00
Hoop and band iron	9.00 to 9.50
Sheet iron	9.00 to 9.50
Wrought drillings	12.00 to 12.50
Stove plate	14.50 to 15.00
Cast borings	9.50 to 10.00

CINCINNATI.

Unexpected Appearance of Spot Iron. —Coke Prices Strong.

December 4.

Pig Iron.—The general market has not changed during the week. Prompt shipment iron is selling at $22.00 to $23.00 Birmingham for No. 2 foundry. There is more prompt iron offered than might have been expected a few weeks ago would come out. There are intimations that some furnaces are not faithful to their contracts. The miscellaneous demand for spot iron is not so active and several round lots have been sold to heavy consumers during the week. There appears to be ample supplies now for immediate wants. We quote for December delivery or prompt shipment as a basis for settling contracts made on our quotations as follows, f. o. b. Cincinnati:

Southern foundry No. 1.	$25.50 to $26.50
Southern foundry No. 2.	25.00 to 26.00
Southern foundry No. 3.	24.50 to 25.50
Southern foundry No. 4.	24.00 to 25.00
Southern fdry No. 1 soft.	25.50 to 26.50
Southern fdry No. 2 soft.	25.00 to 26.00
Grey forge	22.00 to 23.00
Northern foundry No. 1.	25.65 to 26.65
Northern foundry No. 2.	25.15 to 26.15
Northern foundry No. 3.	24.65 to 25.65
Jackson County silvery, 8 per cent	29.15 to 30.15

For forward delivery the market is rather quiet, but there is some business going on all the time. Prices for first quarter are still quotable at $20.00 to $21.00 Birmingham, with January shipment commencing to command a premium. For second quarter sales have been at $18.50 to $19.00 Birmingham. There has been a little business in third quarter iron, mainly on the basis of $17.50 Birmingham.

In northern iron there is not much going on and for the little still available for second quarter delivery $21.00 for No. 2 at furnace is minimum. Silvery iron is higher and for eight per cent $28.00 at furnace is the general quotation, with some holding for $30.00.

The car situation shows no improvement and furnaces are as slow in their delivery as they were a week ago. Belief that prices are at the top is quite general. Buyers of investment iron for resale are not inclined to buy at present figures. We quote for second quarter, f. o. b. Cincinnati, as follows:

Southern Foundry No. 1	$22.00 to 22.50
Southern Foundry No. 2	21.50 to 22.00
Southern Foundry No. 3	21.00 to 21.50
Southern Foundry No. 4	20.50 to 21.00
Southern Foundry No. 1, soft	22.00 to 22.50
Southern Foundry No. 2, soft	21.50 to 22.00

Coke.—The scarcity of cars and inability to get shipments forward is the principle feature of the market. Prices continue strong. There is some contracting for first half of next year, but in a general way trade is quiet. Prices in the leading coke producing districts are as follows:

Gray Forge	19.50 to 20.00
Northern Foundry No. 1	22.65 to 23.15
Northern Foundry No. 2	22.15 to 22.65
Northern Foundry No. 3	21.65 to 22.15
Jackson County Silvery, 8 per cent	28.15 to 29.15
Wise County, Va. Furnace Coke prompt shipment	$3.50 to 3.75 per ton
Wise County, Va. Foundry Coke	4.00 to 4.50 per ton
Pocahontas Furnace Coke prompt shipment	3.25 to 3.50 per ton
Pocahontas Foundry Coke	3.50 to 4.00 per ton
Connellsville Furnace Coke prompt shipment	3.25 to 3.50 per ton
Connellsville Foundry Coke	4.15 to 4.50 per ton
New River Foundry Coke on contracts	3.50 to 4.00 per ton
New River Furnace Coke, prompt shipment	2.75 to 3.00 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.70 to $1.75 per ton on $9.00 pig iron, plus 19 to 20 per cent of the advance on pig iron above $9.00 Birmingham.

Old Material.—There is an increasing tendency reported for consumers to use scrap instead of pig iron and the market is strong with an upward trend for most grades. We quote f. o. b. Cincinnati:

Old No. 1 railroad wrought, net tons	$18.50 to 19.00
Cast machine and foundry, net tons	18.50 to 19.00
Old iron rails, gross tons	26.00 to 27.00
Old steel rails, gross tons	19.00 to 20.00
Old short lengths, gross tons	19.00 to 20.00
Old iron axles, net tons	26.00 to 27.00
Heavy melting scrap, gross ton	20.00 to 21.00
Stove plate, net tons	14.00 to 14.50
Wrought turnings, net tons	11.50 to 12.00
Cast borings, net tons	9.00 to 9.50
Car wheels, gross tons	19.50 to 20.00

PHILADELPHIA.

Relief Furnished by Foreign Iron May be Only Temporary.

December 4.

Pig Iron.—As the close of the year approaches, the market becomes stronger and in a sense more confused. That is, prices reported on the same day by different sellers often vary from 50 cents to $1 a ton, according to the standing of the customer, the reluctance of the producer to sell, variations in the iron, etc. Through it all, however, a rising tendency is seen, and the prediction is made by one of the largest dealers that January and February will see prices ruling between $30 and $40 a ton. That seems a startling figure until it is remembered that low phosphorus iron is already bringing $28, and that that price has also been paid for spot shipments of No. 1 X foundry. The relief to the market from the importation of English iron is apparently not to be of long duration, as prices on the other side have already risen to a point that would make further shipments of doubtful profit. With over 62 shillings paid for the iron, $4.50 for duty and about $1.50 for freight, the total cost leaves little margin for profit over the present prices of similar grades of American iron. Five cargoes have so far reached this port, and several more are expected during the present month. The market continues active, mostly for small orders, and many furnaces refuse to give any quotations for the first half of 1907. Prices which show some slight changes, may be quoted as follows:

No. 1X Foundry	$26.00 to 26.75
No. 2X Foundry	24.50 to 25.50
No. 2 Plain	24.00 to 24.50
Standard Gray Forge	22.00 to 22.75
Basic	22.75 to 23.25
Low Phosphorus	27.00 to 28.00

New Material.—Large orders continue to pour in for nearly every form of finished products, and prices are held very firmly. The advance ordered on plates seems to have had no deterrent effect, and steel and iron bars are also in great demand. Prices may be quoted as follows: Beams, channels and angles according to specifications, 1.83½c to 2c; refined iron bars, 1.83½c to 1.93½c; steel bars,

1.78½c to 1.83½c; plates, 1.93½c to 1.98½c.

Old Material.—The market is very active, as the mills are buying freely and laying in scrap for winter. As their supplies have been running very short a good demand is looked for for some time. Prices, which show considerable increases, may be quoted as follows:

Old steel rails	$20.00 to 20.50
No. 1 steel scrap	19.50 to 20.00
Old steel axles	22.75 to 23.50
Old iron axles	31.00 to 32.00
Old iron rails	26.00 to 27.00
Old car wheels	21.50 to 22.00
Choice scrap, R. R. No. 1 wrought	23.00 to 23.50
No. 1 yard scrap	20.00 to 20.50
Machinery scrap	20.50 to 21.00
Low phosphorus scrap	23.00 to 23.50
Wrought iron pipe	17.00 to 17.50
No. 1 forge fire scrap	16.75 to 17.25
No. 2 forge fire scrap, ordinary	12.50 to 13.00
Wrought turnings	15.75 to 16.25
Axle turnings, heavy	16.00 to 17.00
Cast borings	12.75 to 13.25
Stove plates	16.00 to 16.50

NEW YORK.

No Relief in Sight in Pig Iron Situation.—Steel Prices Rising.

Office of THE IRON TRADE REVIEW. }
Room 1315, No. 150 Nassau St., Dec 4 }

Pig Iron.—The week has brought changes other than higher prices, and a fair amount of inquiry for second half metal. Prices are still extremely irregular, with an upward tendency especially as regards foreign iron which has risen sharply at producing centers. Middleboro and Scotch pig costs 2 and 3 shillings more to buy than last week, and for the former grade $23.50 is offered today and those who have it at disposal ask and receive from $24 up. London quotations for standard and Cleveland warrants are today, 61 shillings 6 pence for the former, and 62 shillings 3 pence for the latter.

Considering the conditions sales have been heavy in all grades except Bessemer, of which no sales are reported. The demand for foundry iron continues as urgent as ever, but is now due as much to a desire on the part of foundrymen to stock up as from an actual immediate need of metal. New England and this vicinity have taken many thousand tons of foreign iron during the week; one firm alone disposed of between 5,000 and 6,000 tons in Boston and New York. The prejudice against Middleboro pig seems to have largely disappeared, for consumers are inquiring eagerly. There have been some heavy sales of basic; there was one lot of 6,000 tons and a total of between 15,000 and 20,000 tons.

Deliveries have improved in a few localities, but on the whole things are no better than a week ago. Transportation matters are especially bad in the south, where the roads are compelled to discriminate in favor of cotton, which has been declared perishable goods by the Alabama commission. This leaves the iron industry in a bad way, for furnaces are not only compelled to pile their output but they are also seriously hampered by irregular shipments of coke and ore.

Domestic foundry iron for nearby shipment and delivery during the first quarter is still selling at all sorts of prices. A common quotation is $27.50 delivered, and reports of sales at yet more exalted figures are not wanting. One car of Virginia No. 2 for prompt shipment sold for $25, furnace. A sale of gray forge at $23 shows that that grade is no longer behind No. 1 and No. 2 in comparative price.

The big melters, always the first to appreciate their needs, are beginning to appear in the market for supplies for the second half of the year. There was one inquiry for 20,000 tons for the last half. This was met with a quotation of $22.50 for No. 2 at the furnace. A sale of 5,000 tons for delivery during the third quarter brought practically the same figure.

The following are quotations for pig iron at tidewater for delivery in the first half of 1907:

Northern Foundry No. 1	$24.00 to 26.00
No. 2 Foundry	23.50 to 24.50
No. 2 Plain	23.00 to 24.00
No. 1 Southern Foundry	23.50 to 25.00
No. 2 Southern Foundry	23.00 to 23.50
No. 3 Southern Foundry	21.50 to 22.50
No. 4 Foundry	21.00 to 22.00

Standard Contracts and Certificates.—Business in pig iron scrap on the New York Produce Exchange has been dull, apparently from lack of confidence in the quality of the metal. It is expected that things will improve materially at the beginning of the new year when the new rules go into effect. There were no sales of importance. The following are quotations for standard foundry iron contracts:

	Bid.	Asked.
November	....	....
December	....	....
January	22.75	24.00
February	22.50	24.00
March	22.00	23.75

Finished Iron and Steel.—The week has been marked by continued heavy specifications on old contracts, the almost complete lack of new orders for rails and structural materials and a continued upward movement in the price of the lighter forms. This morning a producer of steel plates announced another advance of 10 cents, making sales of ¼-inch tank plate on the basis of $1.80, Pittsburg. The total advance of $4.00 per ton has as yet had little effect, for most of the great volume of business now flowing into the offices concerns specifications on old orders.

The structural field is more quiet at the present moment than it has been for many moons. Planning new buildings of a size requiring steel for framing has not been resumed in this city for reasons which are by no means apparent. Stringency in the money market is supposed to have much to do with the scarcity of bids. Also a new season has not as yet fairly opened. Railroad and factory building work is for the moment slack, although in the case of transportation lines it is only delayed. A southwestern line is about ready to place an order for some 8,000 tons of bridge work and bids for a similar amount of steel for subway and terminal work for the New York Central go in today. Orders booked by the American Bridge Co. during November amount to little more than 40,000 tons or 20,000 tons below the average for twelve months past.

Business in rails was confined to comparatively small lots to trolley roads and miscellaneous purchasers. However, a large number of contracts are still pending and it is estimated that fully two-thirds of the total rail capacity of the country for 1907 has already been sold. There are a number of inquiries for minor lots of 5,000 or 6,000 tons each. The demand for light rails continues good.

Mills running on the lighter lines of finished and semi-finished material are all under pressure for delivery. Iron bars are extremely active and the eastern mills are apparently running full, for they are almost without exception clamoring for supplies. It is now difficult to buy bars of any description for less than 1.89½c tidewater.

The following are prices at tidewater: Angles 3 to 6 inches x ¼ inch and heavier, 1.84½c; beams, 3 to 15 inches, 1.84½c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.94½c; flange, 1.94½c; marine boiler, 2.41½c; refined iron bars, 1.84½c to 1.89½c; soft steel bars, 1.74½c to 1.84½c; sheets, No. 28 black, 2.60c.

Old Materials.—The market is strong for all kinds of scrap material, heavy melting steel and cast scrap receiving the most attention. Mills in eastern Pennsylvania bought heavily during the week of melting steel with a resultant stiffening of the market. Cast scrap shares the eager demand for foundry iron. Several hundred tons of machinery cast brought $21 and ordinary run is readily taken at $19 and $20. The following are prices approximately f. o. b. tidewater:

Old iron rails	$25.00 to 25.50
Old steel rails, long lengths	16.50 to 17.00
Old steel rails, short pieces	15.50 to 16.00
Relaying rails	27.00 to 28.00
Old car wheels	21.00 to 23.00
Old iron car axles	29.00 to 30.00
Old steel car axles	21.00 to 21.50
Heavy melting steel scrap	18.00 to 18.50
No. 1 railroad wrought scrap	20.00 to 20.50
Iron track scrap	18.00 to 19.00
Wrought pipe	14.00 to 14.50
Cast borings	11.00 to 11.50
Wrought turnings	12.50 to 13.75
Heavy Cast Scrap	19.00 to 21.00

ST. LOUIS.

High Prices and Slow Delivery of Iron Cause Foundries to Close.

December 4.

Pig Iron.—Two foundries at Belleville closed down in the week just ended on account of the high price of pig iron and the indications are that half of the foundries in that district will be closed down by the middle of the month unless the market becomes easier. One of the foundrymen said today that if he could get all the iron he wanted at the present spot prices, he could not afford to run.

There is still a clamor by houses that bought freely that their iron is not being delivered. A prominent agent said today that several of the furnaces were holding back on their deliveries on old contracts to take advantage of the high spot prices. Twenty-three dollars to $24 Birmingham basis is paid for iron on track in East St. Louis today. Twenty-one dollars is the quotation for the first quarter, $19 for the second quarter and $18 for the third. One contract for the third quarter at $18 was closed today. Quotations for the first quarter, including the freight rate from Birmingham, range as follows:

Southern No. 1	$21.50 to 22.00
Southern No. 2	21.00 to 21.50
Southern No. 3	20.50 to 21.00
Southern No. 4	20.00 to 20.50

Coke.—Coke is steady and in demand. The price runs from $7.05 for Connellsville to $7.30 on Stonega.

Finished Material.—The contract for the steel for the Ely & Walker building, which will require 3,100 tons, has been let to the Cambria Steel Co. The other building which Ely & Walker will erect will be of reinforced concrete.

BUFFALO.

Demand for Spot Iron Greater than Supply.—Foreign Importations.

December 5.

Pig Iron. — Inquiries for pig iron have been numerous the past week and had the supply been equal to the demand a number of large orders could have been placed. The supply, however, continues fully as limited as it was the preceding week and considerable good business was necessarily allowed to go by default. The anxiety among local furnace men is making the market restless. They cannot say whether the furnaces will all operate through the winter season or not. It all depends on whether the ore contracted for all gets down to this end of the chain of lakes. They have written and wired to the ore fields to learn conditions and receive in return assurances that the contracts will be filled about on time. The present supply at the furnaces would not keep the local concerns busy all winter.

Prices on pig iron hover around the high mark. The famine conditions have undergone little change over the week preceding. Northern No. 2 foundry is practically sold out up to July 1. Should any sales be made the price would be $25 and $26, for spot iron, depending on the size of the purchase and the quality of the iron. Malleable Bessemer is very scarce. One price only, $27 for spot, is quoted on this grade. There have been a few small sales the past week. Several sales are reported of southern No. 2 foundry, the price for spot iron being $23 at furnace. The freight charge to Buffalo is $4.65 a ton, making a total of $27.65 on southern. There was a little more activity in gray forge the past week than had been observed for some time past. The sales reported were made at $24. Inquiries for gray forge have been numerous and the indications point to a strong call for the inferior iron the coming week. The furnaces have very little, however, for the market. Only one firm has charcoal pig iron for sale this week. The price quoted is $26.

Foreign iron is now being imported by one Buffalo firm. The firm referred to is receiving two cargoes a week at New York and is supplying New York, Philadelphia and Buffalo with considerable tonnage. From two to four cars a week, loaded with the foreign iron, are brought to Buffalo under contract. From present indications, foreign iron will be seen in Buffalo for many months to come owing to the famine of other grades. The furnaces are all working at full capacity this week. We quote for last half of 1907 as follows:

No. 2 Plain Foundry	$21.50 to 22.00
No. 2 X Foundry	22.00 to 22.50
No. 3 Foundry	21.00 to 21.50
Malleable Bessemer	21.75 to 22.00
Gray Forge	20.50 to 21.00
Charcoal	24.00 to 25.00

BIRMINGHAM.

Few Sales for the Last Half.—Prices are Firm.

December 4.

The demand for iron still holds up in this section. Prices are just as firm as they can be. The strong demand coupled with the railroad car shortage brings about a condition that all iron wanted for delivery between now and April 1 is considered almost spot iron. No iron to be delivered during the first quarter of the coming year is to be purchased under $21 and $22 per ton, No. 2 foundry or No. 2 soft. Iron for sixty days' delivery commands $23. Silvery gray or a high silicon iron, of which there is a little obtainable, is bringing $26 per ton. Iron for delivery during the second quarter of the coming year is selling at from $17.50 to $19 per ton. The Tennessee Coal, Iron & Railroad Co. announces sales of quite a quantity of iron for delivery during the second quarter of the year.

There have been some sales made for delivery during the last half of the year, but so far the aggregate is not sufficient to make much of a boast of it.

Metal Market

CHCAGO.

December 4.

Another advance has been made in copper. Lake is now quoted at 24⅛c to 24⅝c, and casting, 24c to 24½c. Spelter has advanced $1 a ton, and is now quoted 6.65c for car lots. Sheet zinc is without change at 8c list f. o. b. LaSalle in car lots of 60-lb. casks. Pig tin is weak but is without change at 45½c for large lots and 45¾c to 46c for lesser quantities. Lead desilverized is offered at 6.05c to 6.15c for 50-ton lots. Antimony, 28c for Cooksons', and 26½c to 27½c for other brands.

Demand for old metals is good, but prices are without noticeable change. We quote dealers' buying prices, as follows:

Copper wire, 18½c; heavy copper, 18c; copper bottoms, 17¼c; copper clips, 17¾c; red brass, 17¾c; yellow brass, heavy, 13c; yellow brass borings, 12c; red brass borings, 14½c; light brass, 11c; pipe lead, 5.15c; tea lead, 4¾c; zinc, 4½c; tin foil, 33c, pewter, No. 1, 25c.

ST. LOUIS.

December 4.

Lead is quiet and steady at $5.85. No sales today.

Spelter is firm at $6.35 for spot and prompt shipment. The demand seems larger than the supply.

On account of the bad weather in the Missouri-Kansas field lead and zinc ore are both up on spirited bidding by the agents of the independent and trust companies.

THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

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December 6, 1906.

"ALL TRADES UNITED."

It has been truthfully said that "in ship building all trades are united." In another column we present the items entering into the construction of an American freight steamship of about 10,000 tons, that cost about $750,000 to build. Just about half of that cost was represented in the ninety-seven different articles that went into the construction of the ship ($372,793) and the balance was represented in the labor employed in the ship yard in building, or in "assembling the parts"—as some choose to more accurately describe the construction of the ship. One has but to look over the different items to realize that all of them are of a more or less finished character, before they are put into the hands of the workmen in the ship yards; they are the finished products of other shops and mills.

Manufacturers of iron and steel should be deeply interested in this presentation of the different articles and parts composing a finished freight ship. Were the vessel a passenger ship, the variety of the parts would be greatly increased, and the cost, of course, would have been far greater. No such detailed presentation as this of the different items entering into the construction of a finished American ship, with their cost, has ever before been published. This increases the value of the presentation. Readers of the IRON TRADE REVIEW will not overlook the fact that industries with which they are connected furnish by far the greater part of the bulk of such articles and materials. They are: steel plates, ribbed steel plates, shapes, bar iron, bar steel, forgings, iron castings, steel castings, sheet iron, malleable iron castings, rivets, bolts, nuts, hardware, pipe and tubing, plumbing materials, screws, nails, wire rope, wire, chain, valves, safety valves, pressure regulators, wire work, windlass and capstan, most of the parts of steering engines, hoisters, pumps, blowers, feed water heaters, evaporators, signal and speaking tubes, thimbles and shackles, boiler tubes, boiler furnaces, tools, gauges, springs, anchors, chains, bells, axes, electrical equipment, stoves, cutlery, etc. Is there any doubt of the deep interest our readers, and the iron and steel industry, have in the passage of an American shipping bill?

We are not now able to show how many workmen were employed in the assembling of the different parts in the ship yard above described. We hope to do so later. The figures are taken from a merchant ship built very recently in an American ship yard.

If the total foreign tonnage now employed in carrying 90 per cent of our imports and exports, about 6,000,000 tons, were all of the type described in our list—which, however, they would not be—six hundred of them would be required, and their cost would approximate $450,000,000. Really, to duplicate in American ship yards the foreign ships now engaged in our foreign carrying would cost nearer to $600,000,000—possibly $700,000,000. From these figures one begins to realize what it would mean to this country to build the ships at home that are employed in doing our foreign carrying. Labor would get half of that sum—labor in the ship yards, we mean. As a matter of fact, it has been estimated that labor receives about 95 per cent of the actual cost of a finished ship, from the ore and coal in the ground, and the timber in the forest, to the fully equipped and finished ship. All of this labor in foreign countries is enjoying, at our expense, while the labor in our own mills, factories and ship yards is deprived of this work. The country is deprived of the use of the ships and the men in time of need, as, for instance, when we wanted to move 5,000 troops to Cuba, a month or two ago, we had, the first thing, to charter a lot of foreign vessels—and Cuba less than 100 miles distant from the United States!

Again: we send $200,000,000 or its equivalent out of the country, each year, to pay these foreign ships for doing our foreign carrying—a vast sum which should be retained at home.

We are convinced that those who have studied the situation are deeply interested in this matter. We wish all of them realized their deep interest sufficiently to induce them to ask their congressmen to vote for the pending shipping bill.

SEMI-CENTENNIAL OF THE OPEN-HEARTH.

Just fifty years ago the Siemens regenerative open-hearth furnace was patented, the date of the patent being December 2, 1856. It was this invention of Carl Williams Siemens—afterward Sir William—a native of Hanover, but then a citizen of England, which made the open-hearth steel process a possibility. Heath, who discovered the beneficial action of manganese, had in 1845 conceived the idea that cast steel could be produced in large quantities by fusing wrought and cast iron together upon the open hearth of a reverberatory furnace, but lacked means for producing the necessary heat. That desideratum was supplied just half a century ago through the Siemens invention. Sir William worked along the lines of producing steel from pig iron with iron sponge produced outside the furnace. The Martin brothers,

in France, worked upon the production of steel from pig and wrought iron. Their principal patent was obtained in 1865, and in the same year Siemens started building his "Sample Steel Works" at Birmingham. It was at this time, nearly ten years after the patenting of the furnace which made the process possible, that open-hearth steel was made in a commercial way. In 1867 Hon. Abram S. Hewitt visited the Paris Exposition as commissioner of the United States, and became impressed with the merits of the pig and scrap process of Messrs. Martin. In December of the following year Cooper, Hewitt & Co. made the first open-hearth steel in the United States.

The present time may also be considered the semi-centennial of the Bessemer steel making process. Sir Henry commenced his experiments in 1854, while in 1856 he obtained his American patents, these, however, being rendered inoperative through patents afterwards issued to William Kelly, a native of Pittsburg, to whom the patent office accorded priority of invention. The Mushet invention of adding a combination of iron, carbon and manganese to Bessemerized metal, which made the process feasible, was granted September 22, 1856. Without entering into the controversy between Bessemer, Mushet and Kelly, and discussing the character of the different classes of metal produced during the experimental stages, it may be suggested that these dates of half a century back fix better than any other the distinct times when the foundations were disclosed for the present Bessemer steel industry.

The Bessemer process, as is well known, gained the stronger foothold at the start. To this day more steel is made by the Bessemer than by the open-hearth process in both the United States and Germany. In England the open-hearth process gained the ascendency in point of tonnage in 1894, and has kept it every year since. In Germany the existence of large bodies of highly phosphoric ores has dictated the basic modification of the Bessemer process, against the open-hearth, while in the United States the existence of large supplies of low phosphorus ores has given vitality to the original or acid type of the Bessemer process.

In a general way ores have dictated steel processes, and down to the point where a relatively low phosphorus ore permitted choice between the acid open-hearth and the acid Bessemer process. That choice was made in England in favor of the open-hearth; in the United States it has heretofore been made in favor of the Bessemer, as the manufacture of acid open-hearth steel has not increased materially. There is nothing to prevent, however, the use of the basic open-hearth process with ores which by more careful selection could to an extent be used in the acid Bessemer process.

Never so much as now, when the semi-centennial of the regenerative open-hearth furnace can be celebrated, has the steel process of that name shown such vitality as against its great rival, the Bessemer process. Hitherto it has grown upon the increased demand for steel; now it is evincing a clear tendency to grow at the expense of the Bessemer process. A few weeks ago reference was made to the fact that at Duquesne the Bessemer department is to be torn out to make way for the new open-hearth furnaces being constructed there. The same displacement will occur, within a reasonable time, at Homestead. Already the Carnegie Steel Co. makes no plates except of open-hearth steel.

A more important invasion still by open-hearth steel, as indicating tendencies, is that into the field of rails. The inauguration of open-hearth rail making in Alabama was not especially signicant, as Alabama could not make rails by any other process, but the adoption of the process for the new plant at Gary, Ind., was purely a choice between the two processes. The capacity of the first installation at Gary, now under contract, will involve a production of over a million tons of open-hearth steel a year, and the great bulk of this production will be put into rails.

The present swing from Bessemer to open-hearth is chiefly the result of a well defined demand. There was a time when the demand for open-hearth steel was based upon the fact that it was open-hearth steel, and there was then a preference for the acid over the basic process. The engineer sought to control the character of the material he was to use by dictating the process. That spirit has largely disappeared.

The chief reason for the demand for open-hearth steel now is not that it is of necessity fundamentally better than Bessemer steel, but because with open-hearth steel it is possible to dictate qualities by modifications of the analysis. The Bessemer process affords relatively little opportunity for such modification. With the open-hearth process it is possible to produce steel of almost any analysis desired, and the engineer has determined what composition and what physical qualities will best serve individual purposes. The distinction is an important one, and it is good for producer and consumer alike that the subject is so much better understood than it was a few years ago.

NILES-BEMENT-POND CO. DEVELOPMENTS.

It is announced that the Niles-Bement-Pond Co. has acquired the plant of the Ridgway Machine Tool Co., Ridgway, Pa. The latter company was incorporated in 1903 with H. R. Hyde as president; P. R. Smith, vice president; R. J. Powell, secretary and E. C. Powell, treasurer. The main building of the plant is 187 x 255 feet, foundry 112 x 150 feet, forge shop 75 x 150 feet and the pattern storage building and pattern shop the same size. Directors of the Niles-Bement-Pond Co. on Nov. 26 declared a cash dividend of 40 per cent on the common stock, payable Jan. 2 to holders of record Nov. 30. By common consent this dividend will be applied in payment in full at par of $2,000,000 of the $3,500,000 new common stock authorized Nov. 20. The dividend is paid by way of distribution of a portion of the company's accumulated surplus, which amounts to $4,258,000; in addition the Pratt & Whitney Co., whose entire common stock, $1,520,000, is owned (the outstanding preferred stock being $1,225,000), has an accumulated surplus of $1,063,000. The remaining $1,500,000 common stock has all been subscribed for by the present stockholders at par, payable in four installments as desired.

TRY TO BURN FOUNDRY.

Two Attempts Made at Destruction of Open Shop at Buffalo.

Buffalo foundrymen have a new phase of the molders' strike situation to grapple with in the recent desperate attempts to burn the big plant of the Fillmore Avenue Foundry & Iron Works of that city. Two attempts to destroy the plant have been made within one week. The first occurred just before midnight Thursday when the night watchman at the plant discovered fire in the molding department in the rear of the plant. All that saved the plant from meeting the doom planned for it by the fiends was the alertness of the watchman, who extinguished the fire himself. He then notified the police. The superintendent of the Buffalo police department went to the scene personally and examined the place where the fire had started. It was found that the wall which had been set on fire was saturated with oil for a distance of 20 feet. For two nights following a special police detail guarded the place. It was not believed that another attempt would be made.

Sunday night the lawbreakers made another attempt on the property. This time the watchman discovered the men in their criminal work, and fired several shots at them, but all got away. The watchman's statement of the affair indicates that there were six or eight men in the party, which attempted a second time to burn the plant. He claims to have recognized one of the men as a former molder who went on strike last May. Lyman P. Hubbell is proprietor of the Fillmore Avenue Foundry & Iron Works, which usually employs about 50 molders. Forty-five molders struck last May and their places were filled with other men. There has been a great deal of trouble between the strikers and the men who took their places at this plant, their work being interfered with on several occasions. Mr. Hubbell has been approached a number of times by the strikers, but he always told them in fairness that he would be obliged to run an open shop. The men who were hired in the molding department proved efficient workmen and have been paid, in instances, more than the union molders received before the strike. Mr. Hubbell is certain that he is in the right in the matter, and has the co-operation of other foundry owners in Buffalo, many of whom are now conducting strictly open shops. The attack seems to have been especially directed against Mr. Hubbell because he is president of the Buffalo Foundrymen's Association. The foundrymen will take vigorous steps to prosecute the culprits.

PERSONALS.

William H. Allen Jr. will be in charge of the Boston office of the Phoenix Iron Co., Philadelphia, after Jan. 1.

G. C. McDonald, assistant manager for the Illinois Steel Co., has resigned and accepted service with W. F. Burns & Co.

Charles M. Schwab, of the Bethlehem Steel Co., and a party of friends are inspecting silver mining properties in Mexico.

R. W. Simpson, superintendent of the Bessemer rolling mills, of the Tennessee Coal, Iron & Railroad Co., at Bessemer, Ala., has resigned.

W. H. Woodin, vice president of the American Car & Foundry Co., has been elected to the directorate of the McKinley-Darragh-Savage Co.

E. W. Cadwell, superintendent of the foundry of the Samuel C. Tatem Co., Cincinnati, has resigned to accept a position with the Peerless Foundry Co., Hamilton, O.

J. D. Waddell, secretary-treasurer of the Empire Iron & Steel Co., Niles, O., returned to his desk on Monday of this week after an illness of about two months.

F. G. Parker, for 30 years connected with the Cambria Steel Co., for some time as superintendent of the Bessemer department, has resigned and has been succeeded by Frank E. Thompson.

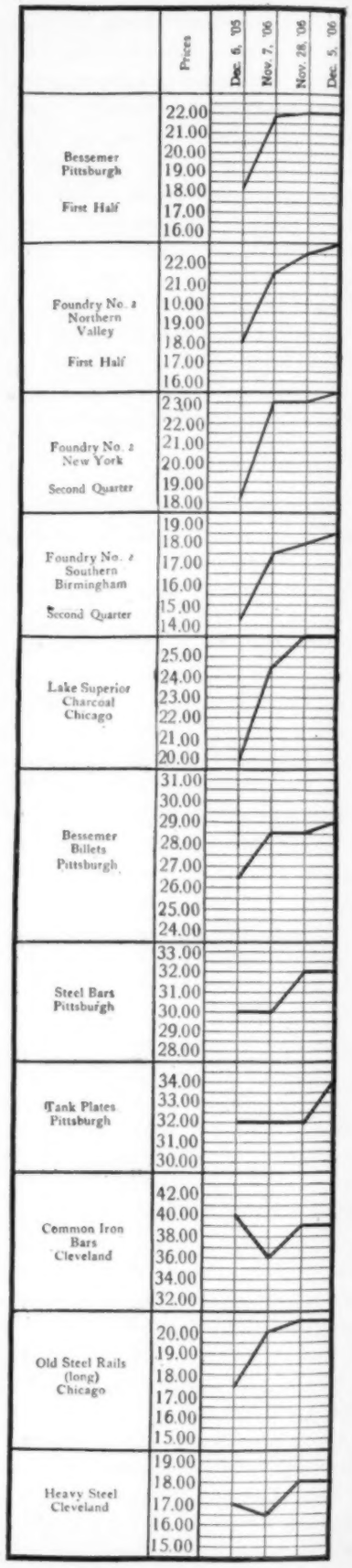
Clifford Egan, assistant superindent of the J. A. Fay & Egan Co., Cincinnati, has been selected as one of the party of Americans who will tour Europe next summer under the auspices of the United States government to study industrial conditons.

T. J. Conlin, vice president of the International Association of Machinists, will serve with Alfred P. Thom, attorney for the southern railroad, and Judge George Gray on the arbitration board to settle the difficulties between the southern railroad and its machinists.

William H. Love, for many years Chicago manager of the Wheeler Condenser & Engineering Co., will remove to New York Jan. 1, serving in the capacity of general manager of the company, with offices at 42 Broadway. Grant Reebe succeeds him as manager of the Chicago office.

The Ohio Galvanizing & Mfg. Co., Niles, O., is increasing its plant by one-third, adding new buildings and machinery for its general manufacturing line.

PRICE CHART.


Prices
Dec. 6, '05
Nov. 7, '06
Nov. 28, '06
Dec. 5, '06
Bessemer Pittsburgh First Half
22.00 21.00 20.00 19.00 18.00 17.00 16.00
Foundry No. 2 Northern Valley First Half
22.00 21.00 10.00 19.00 18.00 17.00 16.00
Foundry No. 2 New York Second Quarter
23.00 22.00 21.00 20.00 19.00 18.00
Foundry No. 2 Southern Birmingham Second Quarter
19.00 18.00 17.00 16.00 15.00 14.00
Lake Superior Charcoal Chicago
25.00 24.00 23.00 22.00 21.00 20.00
Bessemer Billets Pittsburgh
31.00 30.00 29.00 28.00 27.00 26.00 25.00 24.00
Steel Bars Pittsburgh
33.00 32.00 31.00 30.00 29.00 28.00
Tank Plates Pittsburgh
34.00 33.00 32.00 31.00 30.00
Common Iron Bars Cleveland
42.00 40.00 38.00 36.00 34.00 32.00
Old Steel Rails (long) Chicago
20.00 19.00 18.00 17.00 16.00 15.00
Heavy Steel Cleveland
19.00 18.00 17.00 16.00 15.00

RIGID LAW ENFORCEMENT DEMANDED

AGAINST THE LABOR TRUST AND ALL ILLEGAL COMBINES

By the Citizens' Industrial Association of America.—Growing Popularity of the Open Shop.—The Free Labor Movement in England.—Chicago Convention.

Chicago, Dec. 3.—The keynote of the Citizens' Industrial Association of America, which opened its fourth annual convention at the Auditorium this morning, was tersely voiced by W. Collison, general secretary of the Free Labor Association of Great Britain. In his address at the afternoon session, which was devoted to a recital of labor conditions in his country and the efforts of his organization towards rectifying the abuses that have developed from such conditions, Mr. Collison said: "Industry needs originators, not agitators; inventors, not preventors; increases, not decreases of productivity,"—an epigrammatic avowal which found instant appreciation in the minds of his hearers. "The one thing which they (labor unions) dread above all other things," continued Mr. Collison, "and which they seek by every possible means to prevent, is a combination of employers and employed for the purpose of getting rid of the common enemy of both. This combination, however, is bound to come, and when it does arrive the agitator's occupation will cease to be a paying profession."

The convention commenced its labors at 11 o'clock, with 95 delegates present, representing 469 national, state and local associations. The invocation delivered by Rev. William A. Quayle, was followed by an address of welcome by Dr. Howard Taylor, assistant prosecuting attorney of Chicago, representing Mayor Dunne.

Law Enforcement Demanded.

The only resolution adopted at the first day's session, grew out of the speech of the Hon. T. J. Mahoney, vice president of the Omaha Industrial Association, on "The Sherman Anti-Trust Law and Its Application to Illegal Labor Conditions." It demanded the enforcement of anti-trust laws as well against combinations of labor, as against combinations of capital, as enemies of similar character and equally dangerous to the interests of the common people.

The resolution declared that it is the duty of every member of the association and of every public-spirited citizen to use every effort to collect evidence of unlawful conduct on the part of the labor trusts and furnish the same to the public prosecutor, and to demand with all the force and influence at his command the institution and prosecution of appropriate legal proceedings.

Progress of the Open Shop.

President C. W. Post, Battle Creek, Mich., in his address of welcome, said in part:

No year in the history of the United States has marked the progress made in industrial freedom and return of the control of affairs to the hands of the American people as the twelve months from Dec. 1, 1905, to Dec. 1, 1906, and one of the most potent factors in this work has been the Citizens' Industrial Association of America, with its allied branches in some five hundred cities in America.

There has been a marked improvement in the freedom of the press from labor dictation, almost exactly in proportion to the discovery by the owners of the papers that the majority of their readers favored as prompt denunciation of illegal and tyrannical acts of the labor trust, as of the capital trust. Tyranny does not seem popular, whether exercised by corporations or combinations of workmen.

The term "open shop" is used to define an industrial institution open to the employment of workingmen without regard to a membership in any church, secret order or labor union. The "closed shop" is a place of employment closed to all free workmen who do not choose to place themselves under the control of the labor trust. The closed-shop owner agrees to buy his labor of the labor trust alone, and prevent any other workman from securing employment in that institution. Experience has shown that the employers who have committed this grievous sin against the liberties of the American workingmen have suffered as they deserved in practically all such cases, and perhaps much more than they deserve in many. A wrong against principle will sink deeper until the hurt is great enough to demand reformation.

The following great industries have become open shop:

United States government shops.
Carnegie Steel Co.
National Tube Co.
Wm. Cramp & Sons Ship Building Co.
Pressed Steel Car Co.
Westinghouse Electric & Mfg. Co.
Union Switch & Signal Co.
American Locomotive Co.
Baldwin Locomotive Co.
Pennsylvania railroad shops.
Fort Wayne railroad shops.
Baltimore & Ohio railroad shops.
Grand Trunk railway shops.
National Cash Register Co.
American Can Co.
International Harvester Co.
Deering Harvester Co.
American Steel Foundry Co.
The Crane Co.
The Illinois Steel Co.
The Pullman Co.
Allis-Chalmers Co.
American Radiator Co.
United States Cast Iron, Pipe & Foundry Co.
American Brake Shoe & Foundry Co.
Midvale Steel Co.

Only a few are named out of a vast list of industries now free from the "closed shop."

Many of these institutions are so proud of their regained freedom that they advertise in their public announcements that their institutions are conducted on the open-shop plan.

The year has witnessed the organization of the National Erectors' Association, which, in its effect upon the building trades situation in the large cities of the east, is most important. It has done more to open shop the making and erection of structural iron and steel than any other movement in the history of that industry, and by supporting the allied iron associations of New York, the open shop was established in iron construction in that city, and the Housesmiths' and Bridgemen's union, one of the most desperate labor organizations this community has ever seen, was utterly defeated and has formally accepted the open shop. Open-shop steel erection has been established in Pittsburg, Philadelphia and Chicago, and the Pennsylvania Steel Co., is today building the great Blackwell's island bridge across the Harlem river, a four-million-dollar contract, entirely open shop, an unheard of effort in New York. Our association assisted in the organization of this association and our secretary, Mr. Emery, held the acting commissionership and kept the steel men together until we secured the present commissioner, Mr. Drew, whose services deserve the highest praise. The Citizens' Industrial Association has furnished the machinery for the establishment of the movement. Now practically all the steel used in construction is made in the various plants of the American Bridge Co., Pennsylvania Steel Co. and the other large manufacturers under open shop conditions.

In the building trades, the great stronghold of closed-shop unionism, the most remarkable progress has been made during the past year.

The printers have been engaged in a national struggle for the open shop with splendid determination. They have been subjected to continuous misre-

resentation by the typographical union, who constantly present the men employed on the newspapers as part of the number who have won the union demand, whereas the struggle is entirely among job offices, and there is no disagreement and no contest in the newspaper offices. In connection with the printer's strike, it is to be observed that the government printing office is now open shop in fact as well as name.

The National Metal Trades have gained nearly 50 per cent in membership which means a tremendous increase in the open-shop movement among the leading machinery manufacturers and machine shops of the country.

The National Association of Master Sheet Metal Workers declared for the open shop and joined this association.

The prosperity of this country is the result of natural causes, and if uninterfered with by the labor trust, it would be many times greater than it is at present. Many industrial institutions pay their employes higher wages than any scale set by the labor trust for its members, and this is done because the employers, running under an open-shop plan without interference, are reaping the harvest of prosperity and prefer to pay high-class men high-class wages without the slightest reference whatsoever to the labor trust or any of its rules or regulations.

We seem to be slowely approaching a period of peace in industrial affairs. A period like that following a war between nations wherein both have acquired a very wholesome respect for one another. The strife was intense between the employers and employes, but the interposition of the third and by far the greatest and most powerful party, the citizens, with the demand for

The open shop,
No restriction as to number of apprentices,
No boycott,
No violence,
No picketing,

And steady operation of industries, has marked a long step toward permanent industrial peace.

Campaign of Education.

The secretary's report was devoted to a resume of the work done by the association since its organization, and particularly in the past year, in promoting interest in the labor problem. Along this line, he said, "A year ago, 30 newspapers and periodicals responded to an effort to secure the first general distribution of matter bearing upon our labor problem. Within the past two months, over 3,000 newspapers and periodicals have voluntarily met that effort and over 600 newspapers and periodicals of high class are monthly in anxious receipt of our matter. Our correspondence has included leading public men, educators and institutions or research and education, to whom we have supplied and are continuing to supply an ever increasing amount of information concerning the movement for free labor. In addition to the matter supplied for publication and the special addresses of your president, thousands of pamphlets, digests, compilations and legal decisions upon matters of industrial litigation have been circulated throughout the United States, and during the past year, exclusive of correspondence and special publications, over 121,000,000 pieces of literature have been circulated through the United States and Canada. Nor has educational work been merely general; it has been specialized to meet the requirements of particular classes and occasions. It has endeavored to be practical in meeting special situations and answering the demands for information that grew from particular disturbances."

The afternoon session was opened with the report of the committee on credentials, presented by Frederick W. Job, secretary of the Chicago Employers' Association. It reported that the following organizations were represented by delegates: National Association of Manufacturers, 1; National Metal Trades Association, 2; National Founders' Association, 3; National Typothetae, 4; American Anti-Boycott Association, 5; National Merchant Tailors' Association, 6; National Association of Master Painters and Decorators, 7; National Erectors' Association, 8. The report also requested that a rising vote of welcome and appreciation be extended to the delegates from England, W. Collison, representing the Free Labor Association, and the Citizens' Industrial Association of Great Britain, and to Messrs. James G. Merrick, secretary of the Employers' Association of Toronto, and W. H. Wigge, of the Industrial Committee of Quebec, who were present.

Criminal Conspiracies.

T. J. Mahoney, in his address on the Sherman Anti-Trust Law, said that this law makes criminal any contract or combination in the form of a trust or conspiracy in restraint of interstate or international commerce. "There is no doubt," he said, "that the evils of confederated capital were the things that gave rise to the agitation that brought about this law. But when congress came to express itself in the form of a law, it did not limit itself to prohibition against combinations of capital, but made the sweeping prohibition against any combinations that are in restraint of trade. Judge Taft, now secretary of war, was dealing with a rule of the Brotherhood of Locomotive Engineers which provided that in the case of an issue between the brotherhood and any given railroad, members of the brotherhood on any other railroad would refuse to handle the cars of the railroad where the trouble existed. The judge called attention to the fact that the interstate commerce act of 1887 made it the duty of every railroad and of its officers and employes to handle the cars of connecting lines and to handle their freights. And from that he held that it followed that an agreement between the members of the Brotherhood of Locomotive Engineers to refuse to handle the freight or cars of the road where the trouble existed was an agreement in fact to prevent the railroad from complying with the law and that it amounted to an unlawful or criminal conspiracy. As indicating that the elements of force and intimidation are not essential to making an unlawful combination and by way of pointing out that it is not the giving or withholding by workmen of their labor that constitutes a violation of law but the agreement or combination which will control the giving or withholding of labor that may constitute the violation of the law, Judge Taft said:

"It is said that it cannot be unlawful for an employe to either threaten to quit or actually to qiut the service when not in violation of his contract because the man has an inalienable right to bestow his labor where he will. Generally speaking, this is true, but not absolutely. If he ceases, the benefit which his labor is or will be to another by threatening to withhold it or agreeing to bestow it or by actually withholding it or bestowing it for the purpose of inducing, procuring or compelling that other to commit an unlawful or criminal act, the withholding or bestowing of his labor for such a purpose is then an unlawful and criminal act. The same is true with regard to the exercise of the right of property. A man has the right to give or sell his property where he will, but if he give or sell it or refuse to give or sell it as a means of inducing or withholding or compelling another to do an unlawful act, his giving or selling it or refusing to do so, is itself unlawful."

"The Sherman anti-trust law has no application except in cases of restraint of interstate commerce. But in view of the fact that the act itself makes no reference to restraining commerce by force, violence or threats, there can be no doubt that when the question is squarely presented to the courts as to whether an agreement or combination of workmen to give or refuse the labor for the purpose of thereby restraining interstate commerce with the expectation that such

restraint will enable some body of men to prevail in an industrial controversy that the courts will hold such agreement or combination to be a violation of the anti-trust act."

The Free Labor Movement.

W. Collison, of London, followed this speaker with an address on the trade union and free labor movement in the British isles. In the course of his remarks, he said that in every strike in which his association had been pitted against the labor union, the latter had lost. The free labor movement had an unblemished string of victories to its credit. The organization is supported by the employers and employes benefitting by its activities. The former pay two guineas per year membership dues, and the latter two shillings and six pence. He paid tribute to the officers of the labor unions of Great Britain by admitting that they were conservative and able advocates of the policies represented by them; honest and free from grafting propensities. He also said that the benevolent features of trade unions in Great Britain—the sick and death benefits—proved great recuperative elements to depleted treasuries. He also said there was no objection on the part of labor unionists in Great Britain to working alongside non-union mechanics of another trade when employed by the same company. Nor was there known to exist anything in the nature of a shop committee in Great Britain; neither is there tolerated in any plant any discussion of union problems during working hours. The sympathetic strike, in England, he said, was known as the "unprincipled strike." Picketing, he added, is illegal and severely punished by the courts. In addition, he said:

"There are 14,213,000 adult workers in the United Kingdom, 1,905,116 of these are trade unionists, and 12,307,884 are non-unionists, free laborers, blacklegs, scabs or anything else except trade unionists. It is for those who do not choose to belong to unions, the great multitude, that I speak today. My contention is that the tail has wagged the dog too long. What they ask for is the right to sell their labor, free from any fanciful secretarial restrictions. If they are willing to work alongside union men, doing the same work, taking the same money, why should they not? What we demand, WE CONCEDE! The Free Labor Association is not formed to reduce wages. Workmen form its council, and execute its business. But where unfair conditions prevail, where the willing workman is denied the right to live, then our sympathies will be with the workman, and against the union. Our chief reliance is on the moral stamina of the men who constantly join our ranks."

Sounds Note of Warning.

The session Tuesday morning was devoted to the discussion of "The Open Shop in the Building Trades," by Walter C. Drew, commissioner of the National Erectors' Association, of New York, and to a paper read by J. W. Van Cleave, president of the National Association of Manufacturers, on the subject "The Citizens' Industrial Movement from a Manufacturer's Standpoint." The letter suggested the establishment of a manual training department in every public school in the country in order to combat the efforts made by labor unions to keep down the supply of skilled mechanics by limiting the ratio of apprentices.

"As an advocate of fair play I am going to say a few words today to my fellow employers on our duty to give a square deal to our employes," said Mr. Van Cleave. "We see Socialists, Anarchists and extremists of all sorts springing up on all sides. Let us question ourselves and learn whether we have had any part in generating these implacables and destructionists. It is well to understand that some of the captains of industry, the heads of some of the great aggregations of capital and some of the employers of labor in general are in a measure responsible for Gompers and Hearst.

"Let me say that we must recognize the good in labor unionism as well as the evil. We must not condemn all the unions for the sins of some of them. The teachings and practices of most of the labor union leaders help to make Socialists and Anarchists. But so do the injustice and arrogance of the selfish employer."

In the afternoon an extemporaneous talk was had on the subject of labor bureaus, the consensus of opinion being that there should be more system and interchange of ideas in the operation of these departments.

Important Resolutions.

The resolutions adopted called attention to the menace of child labor and to the limitations placed upon apprenticeships by labor unions. The association placed itself on record as approving every lawful means for correcting abuses in child labor, and advocated the passage of such additional laws as might be adequate to bring about a change in existing conditions and to punish the real offenders, whether employer or parent. On the subject of apprentices it was resolved:

"That the Citizens' Industrial Association of America heartily approves and endorses the efforts that are being and will be made in various cities to establish trade schools, and earnestly requests that where so established the members of this association give to such schools their financial and moral support, and as citizens use their influence to have them incorporated as a part of the public school system."

The officers elected for the ensuing year are as follows: President, C. W. Post, Battle Creek, Mich.; first vice president, James W. Van Cleave, St. Louis; second vice president, F. C. Nunemacher, Louisville, Ky.; third vice president, A. C. Marshall, Dayton, O.; treasurer, A. C. Rosencranz, Evansville, Ind.; executive committee: John Kirby Jr., Dayton, O.; George B. Hugo, Boston; Euclid Martin, Omaha; Frederick W. Job, Chicago; C. H. Smith, Aurora, Ills.; T. J. Mahoney, Omaha; George P. Bent, Chicago; Col. T. H. Brown, Sioux Falls, S. D., and J. W. Kranz, Peoria, Ills.

Battle Creek, Mich., was the town selected in which to hold the next annual meeting.

A. S. M. E. CONVENTION.

(Continued from page 1.)

I is written for readers not especially familiar with machine shop practice. Part II is more technical.

An immense slide rule of the type developed during the experiments was on the platform and on the conclusion of his address, President Taylor called on Carl Barth to illustrate its working. Mr. Barth explained the rule in detail and worked out with it several problems in finding the proper feed and speed for a machine tool. Mr. Taylor's address is one of the most valuable contributions to engineering literature in many years.

As the program had been slightly altered to permit an excursion to the Sandy Hook gun proving grounds, some of the business scheduled for Wednesday was presented at this session. The result of the election of officers was announced, Prof. F. R. Hutton, for 25 years secretary, being elected, with scarcely any opposition. He was escorted to the chair by ex-Presidents W. R. Warner and C. W. Hunt, and was greeted by great applause. Prof. Hutton feelingly thanked the society for the honor conferred on him, stating that he laid down his work as secretary with regret. The meeting then adjourned to the lower floor, where a collation was served.

The attempt made by Gus C. Henning to have the court issue an injunction on the ground that the election of officers was illegal on account of ballots not being mailed at the proper time, failed.

Sales agents of the Tennessee-Republic companies have been holding a conference in Birmingham this week, discussing the conditions throughout the country and the probable conditions towards the end of the coming year. The agents were shown all the works of the company in this section.

THE PARTS OF A SHIP.

Following is a list of ninety-seven different articles that entered into the cost of an American freight steamship, 500 feet long, of about 10,000 gross tons register, built in an American ship yard two or three years ago. We present the articles, with their cost, in order that readers of the IRON TRADE REVIEW may see to what an extent they are interested in the building of our shipping. The matter is more fully considered on our editorial pages this week, to which we refer our readers:

Plates	$127,920.00
Ribbed steel plates	764.00
Shapes	60,654.00
Bar iron	8,800.00
Bar steel	1,613.00
Forgings	13,425.00
Iron castings	17,557.00
Steel castings	5,244.00
Sheet iron	1,085.00
Malleable iron castings	172.00
Brass castings	8,816.00
Manganese bronze castings	7,555.00
Rolled brass	5,181.00
Bearing metal	2,808.00
Rivets	13,550.00
Bolts, nuts, etc.	3,100.00
Lumber	10,274.00
Hardware	423.00
Glass	262.00
Paint materials	6,918.00
Pipe and tubing brass and iron	6,913.00
Copper	5,174.00
Pipe fittings	1,090.00
Plumbing materials	600.00
Screws	367.00
Nails	119.00
Wire rope	911.00
Manila rope	1,454.00
Wire	13.00
Gum	279.00
Sheet lead and pipe	650.00
Sand	25.00
Cement	727.00
Zinc	55.00
Chain	110.00
Tallow	453.00
Oils and grease	287.00
Coal	1,141.00
Packing	501.00
Valves	1,819.00
Safety valves	356.00
Pressure reg.	366.00
Oakum	36.00
Cotton	15.00
Pitch	23.00
Bricks	48.00
Wire work	40.00
Radiators	16.00
Windlass and capstan	3,644.00
Steering engine	6,200.00
Hoisters	6,300.00
Pumps	4,675.00
Blowers	1,700.00
Feed water heater	487.00
Evaporator	1,020.00
Signals and speaking tubes	992.00
Blocks	911.00
Thimbles and shackles	112.00
Spars	937.00
Boiler tubes	4,686.00
Boiler furnaces	4,800.00
Tools	256.00
Gauges	224.00
Lubricators	26.00
Asbestos	147.00
Boiler and pipe covering	510.00
Metallic packing	257.00
Springs	30.00
Life boats	452.00
Anchors	1,708.00
Anchor chains	4,414.00
Bells	55.00
Whistle	80.00
Nautical instrument	735.00
Running lights	193.00
Life preservers	60.00
Hose	250.00
Life gun	80.00
Flags	75.00
Axes	15.00
Fire buckets	10.00
Electrical equipment	2,947.00
Canvas work	920.00
Printing	40.00
Stoves	250.00
Kitchen utensils	294.00
Glassware and China	115.00
Cutlery and Silver	162.00
Upholstery	350.00
Furniture	700.00
Bedding Inc. mattresses and blankets	700.00
Linen	200.00
Carpets	175.00
Mirrors	60.00
Medicines	50.00

OBITUARIES.

Eustace E. Souther, president of the E. E. Souther Iron Co., St. Louis, died Nov. 24 at his home in that city at an advanced age.

Amos Perriton, a retired iron merchant, died Nov. 27 at his home in Brooklyn. He was born in Newfoundland in 1836.

Martin Wittmer, a mining engineer for some time connected with the Carnegie Steel Co., died Nov. 24, at Glenshaw, Pa., at the age of 49.

Fred E. Ford died at his home in Chicago Nov. 24 at the age of 44. He was manager of the order department of the Illinois Steel Co., with which concern he had long been associated.

Richard M. Barnett, proprietor of the Brass Founders' Supply Co., Newark, N. J., died Nov. 30. He was the father of Stephen D. Barnett, president of the Barnett Equipment Co., also of that city.

Warren H. Getchell, for several years secretary of the Twin City Iron Works, died Nov. 10 at Minneapolis, at the age of 82. He was born in Maine, and in 1882 became connected with the above named company. A son and a daughter, the latter the wife of President O. P. Briggs, of the National Founders' Association, survive him.

General Willard Warner, a pioneer in the iron industry of the south, died suddenly Nov. 23 at the age of 80. He was born at Zanesville, O., moving to the south at an early age. He was a veteran of the civil war and a senator from Alabama during the reconstruction days. Some 12 years ago he moved to Chattanooga where he was connected with a number of industrial concerns. His son, Willard Warner Jr., is manager of the Roane Iron Co., Rockwood, Tenn.

Arthur Vaughan Abbott, well known as a civil, mechanical and electrical engineer, died Dec. 1, at St. Luke's hospital, New York, after a brief illness. He was born in New York in 1854, and had been a member of the American Institute of Mining Engineers since 1882. He was vice president of the American Institute of Electrical Engineers, chief engineer of the Chicago Telephone Co. and engineer of Westinghouse, Church, Kerr & Co. He was also the author of several well known books, including "History and Use of Testing Machines," and "Treatise on Fuel."

George Nicholson, chief engineer of the Queen & Crescent railway, died Dec. 2 at his home in Covington, Ky. He was born in England in 1840, coming to America when a young man. At the close of the Civil war he took up engineering, first in the west and later in marine and military work. He was connected with the Phoenix Iron Works for a time and selected the iron for the Rock Island bridge over the Mississippi. He was offered many high positions, among them being that of chief engineer of the Panama canal when that project was in the hands of the French, but preferred to remain in the post which he held at the time of his death.

Joseph J. Crowther, one of the oldest furnacemen in the Mahoning valley, died Nov. 29 at the home of his daughter in Lorain, O. He was born in England in 1824 and came from a family of furnacemen who operated a number of plants after their emigration to this country. Mr. Crowther built Eagle furnace at Brier Hill, O., Clinton furnace at Pittsburg, a stack for the Belmont Iron Co., at Martins Ferry, O., and one for the Gaylord Iron Co., at Newport, Ky., all of these being erected before 1870. He then in turn served as manager of various plants, being in charge of the furnaces of the Ashland Coal & Iron Co., at Ashland, Ky., when he retired from business, and settled down in Youngstown, O.

The Middletown Car Works, Middletown, Pa., has been making a specialty of its King-Lawson patent steel dump cars and has sold a large number of them to contractors. Among its orders is one for the Delaware, Lackawanna & Western Railroad Co.

PLANT OF THE MARION STEAM SHOVEL CO

HOW EXCAVATING MACHINERY IS BUILT.

**The Interesting Growth of a Large and Varied Shop.—
Changing Practices in Manufacturing
Illustrated.**

The manufacture of the modern steam shovel requires a plant of great magnitude and variety, the necessary shops comprising carpenter shop, foundry, pattern shop, machine shops, boiler shops, etc. The Marion Steam Shovel Co., Marion, O., possesses probably what is the largest plant of this character in the country. Located at the junction of a number of railroads in Marion, it has grown from a comparatively small beginning to an establishment employing 1,300 men and covering many acres of ground.

The Marion Steam Shovel Co. commenced business in August, 1884, with Henry Barnhart, the inventor of the shovel, as general manager. That year, the company built one shovel. A few years later the output was 40 shovels per year, and at the present time, it ships that many shovels in a month. The shop and equipment for the manufacture of these machines have grown with the business. The first buildings, as shown in the accompanying plan, were located on the north side of Center street. As the business grew, additional buildings were erected, and then the property on the south side of Center street was purchased and the buildings shown thereon in the plan were put up. Recently, the company has extended its property to the westward, the city vacating a street to permit the expansion. Plans are under consideration for a still further extension of the shops, which will be erected on this newly acquired property.

A plant which has grown gradually as this one has does not always possess the ideal arrangement for routing the work from commencement to finish. Favored by the ability to obtain vacant property adjoining the original buildings, however, the plant is not so badly handicapped in the matter of arrangement as might be imagined. The initial operations, such as the building of frames, boilers, the making of castings, etc., are performed in the shops in the south side of Center street. The frames are put together, mounted on their wheels, and the boilers placed. They are then hauled to the erecting shop on the north side of Center street. The machine shops are all located on this side of the street and the smaller pieces and finished castings moved through them to the erecting shop where the shovel is assembled complete with the excep-

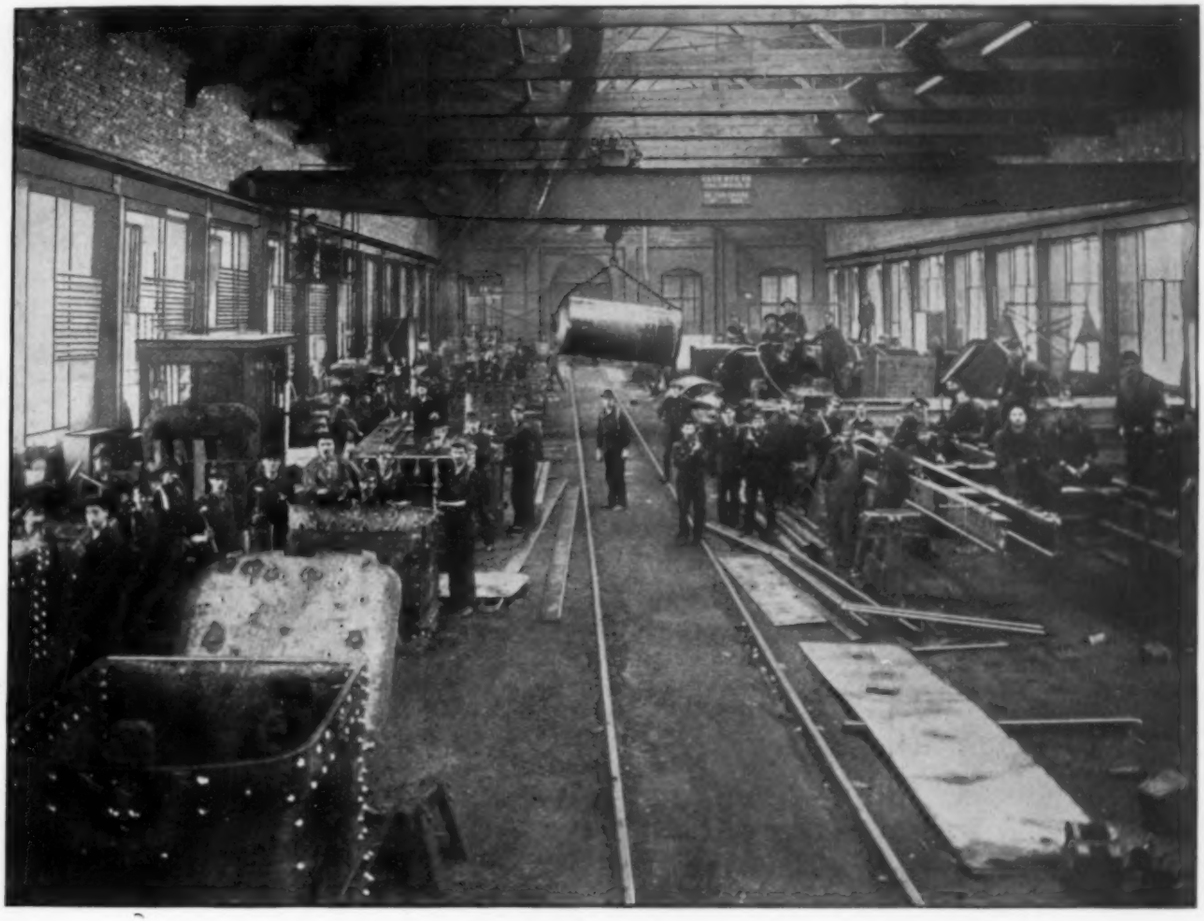
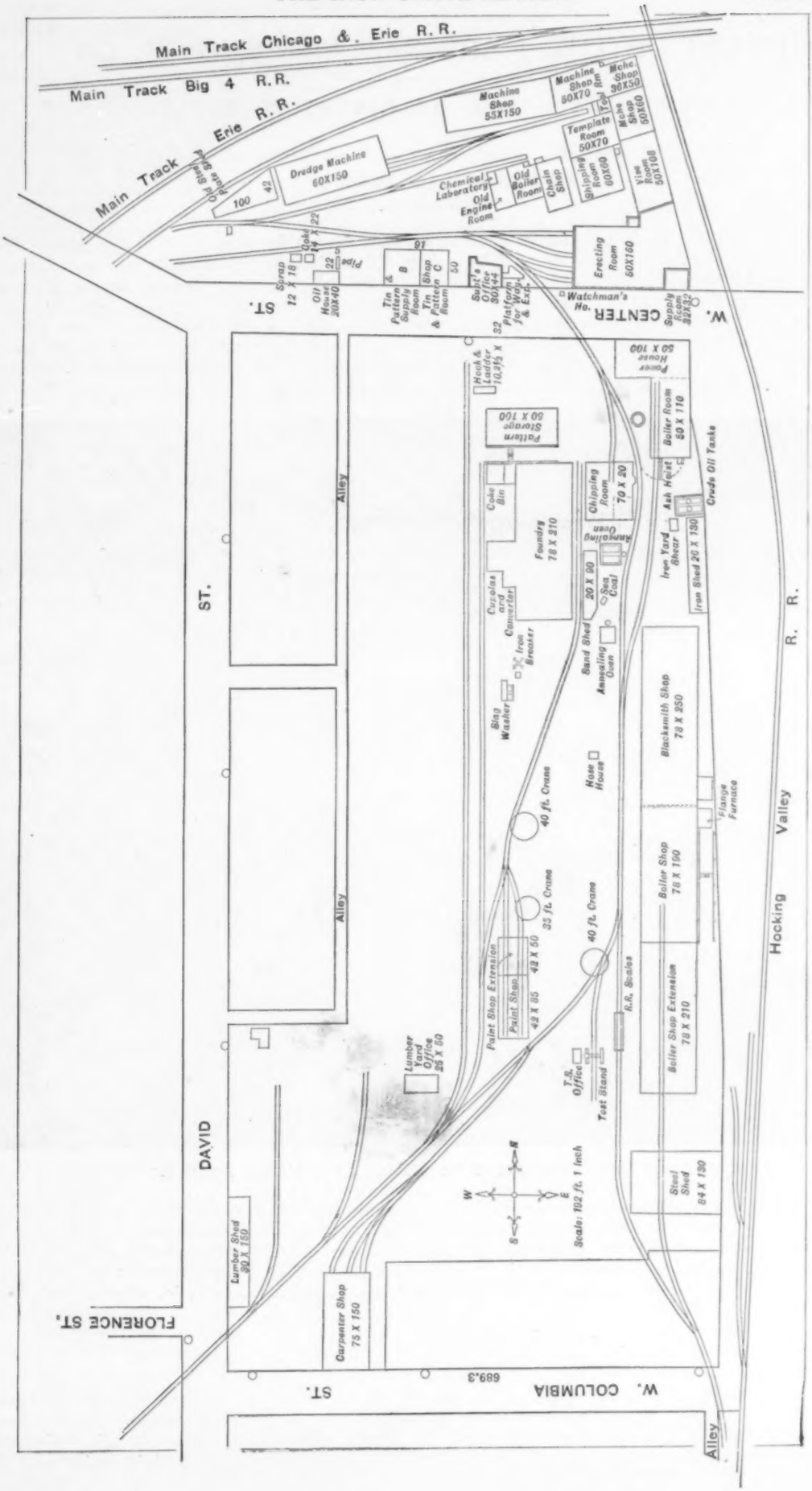


FIG. 1.—ASSEMBLING DEPARTMENT OF THE BOILER SHOP, MARION STEAM SHOVEL CO.



LAYOUT OF MARION STEAM SHOVEL CO. PLANT, MARION, O.

tion of the cab. For the building of this portion of the machine, the shovel is taken to the wood shop on the extreme south side of the property, from whence it goes to the paint shop and then to the testing stand where all the shovels are tested under their own steam before shipment.

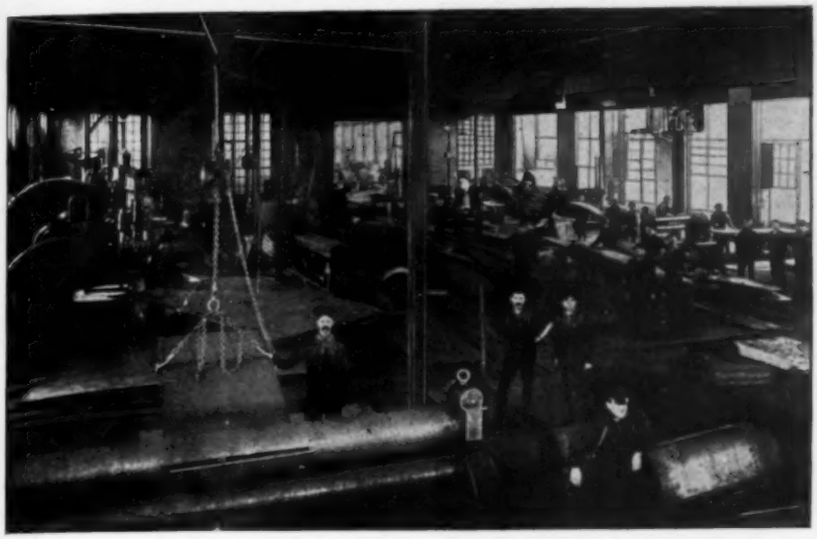


FIG. 2.—VIEW OF THE MACHINE DEPARTMENT OF THE BOILER SHOP.

The growth of the plant having covered a period of years, naturally illustrates the practice in shop construction and equipment of the different portions of that period. The original shops are the low ceiled comparatively dark affairs that were common 25 years ago. The light is further obstructed by the mass of belts driving the many machine tools in the building. The buildings on the south side of the property have been erected within the past few years and are splendid examples of the most modern type of foundry and machine shop construction. The policy of the Marion Steam Shovel Co. has always been of the most liberal character and there has not been the slightest hesitation in scrapping machinery when it could be replaced with something better, or in modernizing and rebuilding the shops as soon as it was discovered that the work could be turned out with greater facility or at lower cost under the new arrangement.

The natural sequence of this policy is the gradual disappearance of the older shops and tools. This is especially noticeable in the machine shops which are now in the transition period. One of the machine shops has been entirely modernized. All the old belt-driven tools have been eliminated, their places being taken by modern, high-powered, motor-driven machines; the roof has been raised to permit the installation of a traveling crane and everything in this building has been brought in line with the best ideas in machine practice. The shop immediately adjoining is undergoing these changes. A great many of the tools are still eminently satisfactory for the work they are now required to do. Other tools which had outlived their usefulness, or which it had been discovered were not capable of turning out work as economically as tools now available, have been replaced by these more modern machines. All of the new machines are motor-driven and in a comparatively short time there will not be a belt-driven machine in the place. It is probably due to this liberal policy that the company has attained its present commanding position in its field. The various shops may now be described in greater detail.

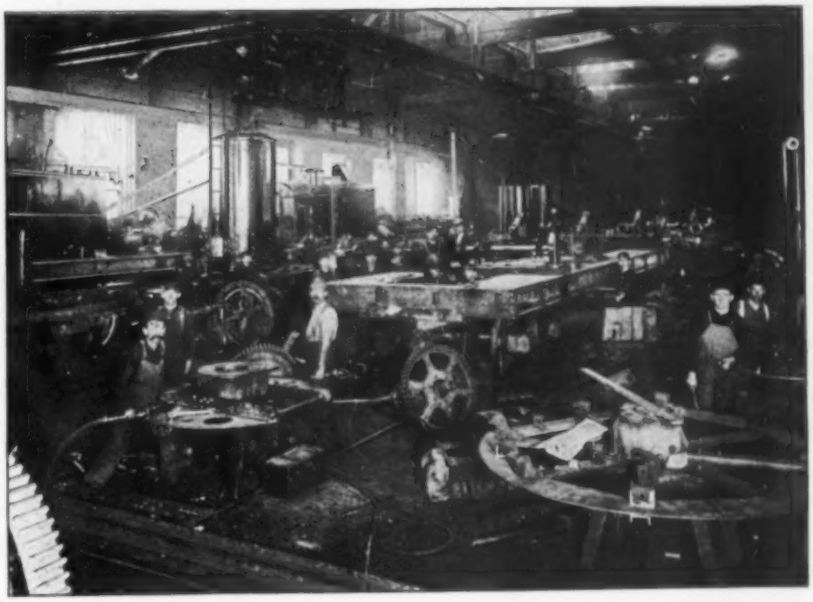


FIG. 3.—ERECTING SHOP.

The Boiler Shops.

The boiler shops comprise two adjoining buildings 78 x 190 feet and 78 x 210 feet, respectively. In these shops are built the boilers, frames, tanks, trucks, etc., for the shovels. The smaller building might be more properly known as the machine department of the boiler shop and in it all work originates. Here the work is laid out, drilled, punched or flanged and it is then carried to the other building where it is assembled. The illustration, Fig. 1, shows the interior of one end of the machine department while the illustration, Fig. 2, is a view of the erecting department. The equipment of the machine department comprises five six-foot motor-driven radial drills, three electrically-driven punches and three hydraulic punches. The capacity of the hydraulic punches ranges from a ¼-inch up to a 12-inch hole. The usual shear equipment in the boiler shop is installed and comprises among other things a Lennox rotary bevel shear. Flanging is done in a 350-ton hydraulic press with plates five by eight feet.

The riveting equipment comprises a stake riveter with a ten-foot gap and a capacity of 150 tons pressure on the rivet, together with a small portable hydraulic riveter for tank work and numerous pneumatic hammers for both riveting and shipping. The transportation facilities of this department comprise a ten-ton electric

traveling crane serving the entire west side of the building and jib cranes equipped with a pneumatic hoist at each machine, together with numerous trolleys in different portions of the building.

The erecting department contains no stationary machinery of moment, two electric cranes covering the whole floor, but is thoroughly equipped with portable pneumatic tools, such as hammers, riveters, portable boring machines, screw cutters, staybolt nippers and butting tools, and any part of the floor may be reached from two electric cranes which traverse the shop. In this department are assembled, in addition to the boilers and tanks, the trucks for the shovels, dippers and frames.

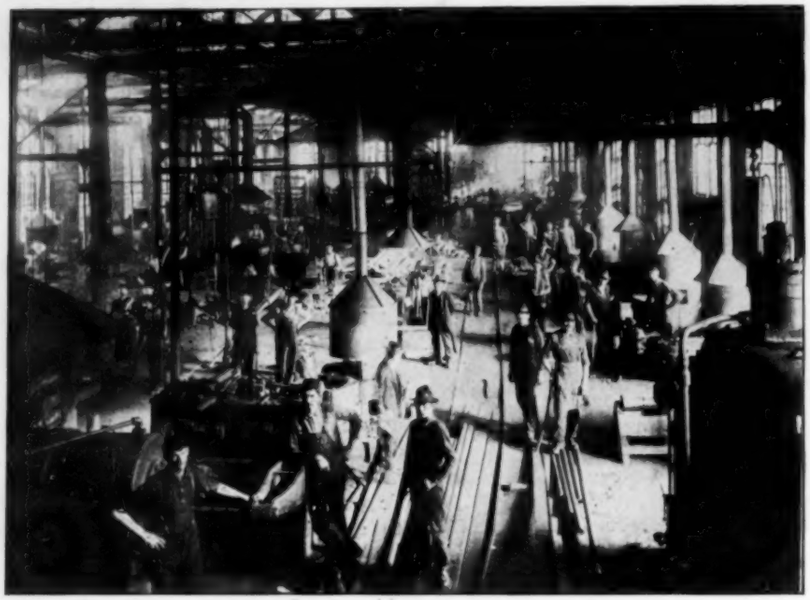


FIG. 4.—THE BLACKSMITH SHOP.

The Blacksmith Shop.

The blacksmith shop adjoins the boiler shop on the north. In dimensions, it is 78 x 250 feet and contains 36 forges. An interior view of this shop is given in Fig. 4. The greater number of the forges are located along the two side walls of the building, the center of the shop being reserved for the larger heating furnaces and power hammers. The forges are on the up-draft principle, each fire being surmounted by a funnel connected to a flue exhausted by a No. 10 Buffalo fan direct-connected by an electric motor.

The most noticeable machine in this department is a 450-ton hydraulic upsetting press capable of forming a 12-inch boss on a seven by seven-inch bar. This machine is used in the forging of the A-frames used to support the boom of the completed shovel and does in about five minutes what formerly took a gang of men half a day to accomplish. Additional hydraulic equipment in this shop comprises a shear of capacity of 4¼-inch square bar, cold, and a small-size press for forging, bending, etc. Four steam hammers are used, one a 2,000-pound, two 800-pound and one 1,800-pound. The presses and hammers are each equipped with individual heating furnaces supplied with oil fuel.

To the south of the boiler shop is a steel storage building 84 x 130 feet. In this building are stored the various parts required for the assembling of the frames, trucks, boilers and various parts of the shovel which are put together in the boiler shop extension. To the north of the blacksmith shop is a shed for the storage of iron for use in that department.

The Foundry.

The foundry is also one of the group of buildings on the south side of Center street. The main building is 78 x 210 feet with a couple of extensions in which are installed the cupolas and converter and coke bin. The foundry makes steel castings in addition to gray iron ones, the Bessemer process being used. The foundry is served by a six-ton electric traveling crane which reaches every portion of the main floor of the building.

Two cupolas are installed in the extension, of eight and ten tons capacity, respectively. The larger one is used for gray iron castings and is located on the ground level. The eight-ton cupola melts iron for use in the converter for steel castings. It is installed on a platform some 12 feet above the ground level in order that it may discharge directly into the converter below it. The converter is of three tons capacity and is tilted by means of an electric motor driving worm gearing on the converter trunnion.

Two-thirds of the floor space in the foundry is used for steel casting work,

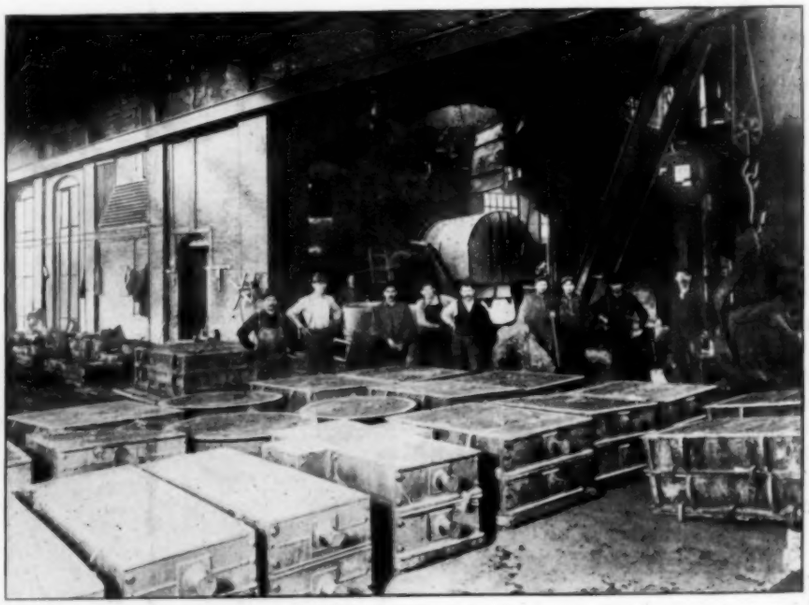


FIG. 5.—PORTION OF FOUNDRY SHOWING CONVERTERS AND CUPOLAS.

the balance for gray iron. As steel castings are only poured on alternate days, the floor space required is naturally larger than that required for the gray iron castings which are poured

every day. The foundry is equipped with the usual accessories in the shape of ladle heaters, melting furnaces for additions to the steel in the converter, pneumatic tools for cleaning castings, emery wheels and rattlers.

For use in certain portions of the shovel, such as the teeth and sides of the dippers, the company has devised a special steel known as "hard-tuf," which possesses the properties of being so hard that it is difficult to touch it with a tool and yet tough and pliable. The alloys used in the manufacture of this steel are melted in a Rockwell, double-chamber melting furnace just outside of the foundry.

A number of buildings auxiliary to the foundry are grouped with it. One of these is a pattern storage 50 x 100 feet directly to the north of the foundry and some 40 feet distant. It is so constructed as to remove as much danger as possible from exposure fires. Light is obtained by means of a skylight in the roof over a central court. The building contains five floors which are shelved, the floors and shelves being made by placing slate two inches apart, thus allowing a free circulation of air through the pattern. A sand shed, 20 x 90 feet, divided into separate rooms, provides storage space for the various brands of sand used in the foundry. A building, 70 x 80 feet, is used for cleaning castings, being provided with a full equipment of pneumatic hammers, sand, blast, etc. Two annealing ovens are also situated convenient to the foundry.

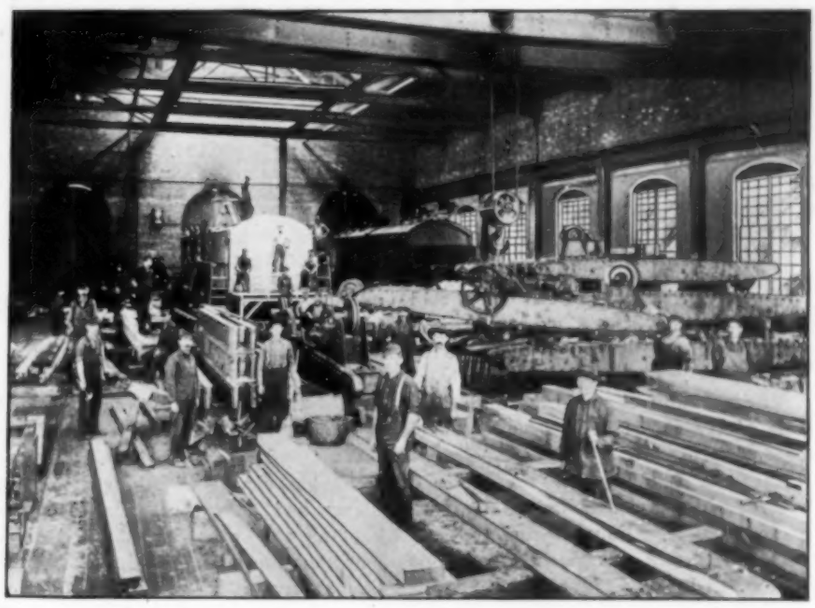


FIG. 6.—THE CARPENTER SHOP.

Carpenter and Paint Shop.

Two other buildings of importance in the group on the south side of Center street are the carpenter and paint shops. The carpenter shop is a building, 75 x 150 feet, located at the extreme south end of the property. In this building are built the booms for the shovels and such other wood work as may be required, including the cab. The boom consists of a heavy oak timber armored with iron. The wood is used in order to give elasticity to the boom, as it has been found that an all-steel boom is sometimes strained beyond the elastic limit and given a permanent set. This rarely happens with the boom made of both wood and steel.

The carpenter shop is equipped with a 20-ton traveling crane, and four standard gauge railroad tracks run into it. The shovels are brought from the erecting shop on their own wheels and run into the carpenter shop on these tracks. The most noticeable piece of machinery in this building is a wood planer capable of taking a timber 24 inches square and 51 feet long. Additional equipment comprises a small sticker, a bolt cutter, a drill press and band saw. The building is heated by means of a boiler and in an adjoining room which also furnishes steam to run an engine and generator for lighting the carpenter and boiler shops. The paint shop, 42 x 135 feet, is situated at a distance from the other buildings, so as to minimize the danger from fire.

FIG. 7.—THE CHEMICAL LABORATORY.

The Machine Shops.

The machine shops are located on the north side of Center street and form a U-shaped group of buildings with a number of other buildings located in the center of the U. The machine shop comprises three departments, housed in separate buildings, each department under a separate foreman. It is in this section that the modernizing of the plant is most noticeable. The heavy machine shop, 55 x 150 feet, contains nothing but motor-driven tools, and is equipped with a ten-ton electric traveling crane. The tools in this department consist principally of heavy lathes and planers and large boring mills. The machine shop directly adjoining this one is 50 x 70 feet and has been almost completely modernized. The greater number of the earlier tools have been eliminated, although a few still remain. There is no traveling crane installed in this room for various rea-

sons. In the first place, the roof trusses are too low to permit of it, and furthermore, the work done here is of a light character and is usually finished in one machine. There is, therefore, no necessity for the extensive transference of castings from one machine to another. Jib cranes are installed through the center and along the walls of the building, each crane serving a group of machines. These cranes are all equipped with pneumatic hoists and are used to facilitate the placing and removal of work from the machines. The room adjoining this second machine shop, 36 x 50 feet, is still in the belt-driven period. But few of the older machines have been replaced, although a start has been made, and it will be but a comparatively short time until this shop is brought up to the high standard of all the others.

The most striking thing about these machine shops is that the floor space has been utilized to the last degree. The machines are placed as closely together as it is possible, and, in some cases, four ranks of lathes are arranged along the side of a shop. This extreme utilization of area is made possible by the fact that the assembling is done in the erecting shop and that no floor space is necessary for this work.

Extending across the base of the U is the vise shop in which some 40 or 50 men are employed in assembling engines, fitting up rods, gears, shafts, etc., for the erecting shop. This shop is equipped with radial drills, punches and shears, emery wheels and cold saws. There is also a 200-ton hydraulic press for pressing on their shafts, discs, gear wheels, etc.

The erecting shop forms the third side of the U. It is 80 x 160 feet and is equipped with two six-ton electric cranes for handling all the material required in the assembling of the completed shovel. Four tracks are laid in this building, on which the shovels are erected. Each track will accommodate two shovels, so that eight can be assembled in this building at one time. In another building, there are tracks for two shovels, so that ten shovels in all are under way at once.

Laying-Out Department.

A particularly valuable feature which has contributed largely to the success of this company's product is the method of laying out the work for the various machines. This is done in a separate department and all work is laid out to templates. Wherever possible, the work is done with a jig, so that all pieces of a given kind are interchangeable. The man at the machine has nothing to do but follow the marks given him by the laying-out department and the responsibility for bad work is readily placed.

Adjoining the template room on one side is the tool room which is equipped with lathes, milling machines, standard and special grinders for the manufacture and repair of tools. The tool room has charge of all jigs and templates and sees to it that they are kept up to the proper standard of repair and measurement. A messenger boy system is used for the distribution of tools, call bells being situated at various points throughout the shop, so that it is not necessary for the men to leave their work.

Adjoining the template room, on the opposite side from the tool room, is a shipping room in which are kept at

FIG. 8.—ONE OF THE MACHINE SHOPS, MARION STEAM SHOVEL CO.

all times a large stock of duplicate parts for the repair of shovels which are in use. As soon as any one of these parts is shipped or used in the construction of a new machine, it is immediately replaced, so that there is no delay in filling orders for repair parts.

To the west of the machine shop is a building, 60 x 150 feet, known as the dredge machine shop. This contains the two tracks mentioned above for the erection of steam shovels and also a complete equipment of machine tools for the manufacture of dredges. Miscellaneous buildings in this portion of the property comprise the superintendent's office, pattern shop, tin shop, chain shop and laboratory.

The pattern shop is equipped with the usual machinery for the manufacture of patterns, together with an ingenious gear pattern machine which cuts gear teeth patterns in wood, much as they would be cut in metal by a milling machine. The superintendent's office contains the engineering department which, at the present time, employs about 15 draftsmen.

Yard.

The yard contains something over two miles of tracks and switches, connecting the various shops. Two locomotives are employed continually to shift cars of material and shovels from one portion of the works to another, and to receive and ship freight over the various connecting railroads. The testing department is located on one of these switches and three gangs of men devote their entire time to testing the shovels under steam. A number of jib cranes are installed in various portions of the yard for handling material to and from cars. These are operated by compressed air, and there is also a 15-ton locomotive crane for taking care of work in portions of the yard where there are no stationary cranes. Side tracks run into the yard from the Big Four, Hocking Valley, Erie and Pennsylvania railroad systems, affording excellent shipping facilities.

The power plant is located with the group of buildings on the south of Center street and comprises an engine house, 50 x 100 feet, and a boiler house of the same dimensions, forming an L. The engine room equipment consists of a 20 x 42-inch 300 - horsepower Corliss engine belted to a 185-kilowatt, 500-volt generator and a 14 x 24 Buckeye engine belted to a 90-kilowatt, 500-volt generator. There is also a 100-horsepower, 13 x 12-inch Ball engine belted to an 80-light and a 35-light Brush generator. A Wiemer blowing engine, 18 x 30 x 48 inches furnishes blast for the Bessemer converter. Two air compressors with a capacity of 1,000 cubic feet of free air per minute complete the equipment of the engine room.

The boiler room contains eight horizontal return tubular boilers, 72 inches diameter by 18 feet long, each rated at 150 horsepower. These furnish steam at 125 pounds pressure per square inch. The waste gases are discharged to a steel stack 12 feet in diameter by 126 feet high. A tunnel extends underneath the ash pits of the boilers in which is laid a narrow gauge track for an ash car. The ashes are discharged to this car which runs outside the building to a pit. A pneumatic hoist lifts the ashes from this car and delivers them to a railroad car for disposal. A trestle runs into the boiler room opposite the boilers and coal is discharged directly from the cars to the boiler room floor.

The various buildings of the plant are connected by an underground tunnel containing pipes for the exhaust steam, water, compressed air, electric light wires, etc. The plant is heated entirely by exhaust steam from the various engines and the water condensed in the heating system is returned to the boiler room and used over again. Fire protection is furnished by means of a shop fire department comprising a hose and hook and ladder company and a well-drilled corps of men. A hospital situated at a central portion of the works renders first aid to any men who may be injured while at work.

The organization of the shop comprises a superintendent, two assistant superintendents and three departmental superintendents. The various shops are under the supervision of 29 foremen and the men under these foremen are divided into gangs of various sizes, each of which is in charge of a gang boss, there being from one to ten gang bosses under each foreman. The general officers of the company, at the present time, are: President and general manager, G. W. King; vice president and treasurer, Frank Huber; secretary and sales manager, A. E. Cheney; general superintendent, Busby P. Sweney.

Among the Pennsylvania corporations which have recently increased their capital stock with a view to making enlargements are the General Castings Co., Pittsburg, $150,000 to $300,000 and the Fort Pitt Spring & Mfg. Co., Pittsburg, $50,000 to $250,000.

CINCINNATI INDUSTRIAL BUREAU EXCURSION.

On Tuesday, Nov. 27, the Cincinnati Industrial Bureau carried out its arrangements for the second annual excursion of the bureau, which proved to be a success in every particular. Among the large industries visited by the excursionists was the plant of the L. Schreiber & Sons Co. in Norwood. This plant moved to Norwood two years ago and buildings are still in the course of erection. The plant occupies a 14-acre tract, about half of which is covered with buildings. Four hundred hands are employed, with a weekly payroll of about $7,000. Together with its plant on Eggleston avenue, the company does a business of $1,000,000 annually, in structural iron. The business men who attended the excursion were entertained at luncheon by the Schreiber Co. President William Lodge of the Industrial Bureau, called upon one of the directors of the bureau to make a few remarks. Mr George Dieterle responded, saying that the trip was educational and emphasized the necessity of a belt railroad line around Cincinnati.

Mr. Charles Schreiber of the company replied on behalf of the firm, bidding all a hearty welcome, and describing briefly the plant and what the company plans to do. The visitors were much surprised at the beauty of the work done by the company in some of its departments. Handsome souvenir bronze calendars were given to the visitors.

The next stop was made at the Bullock Electric Mfg. Co. plant, also in Norwood. A half hour was consumed in visiting the various departments. This plant was established in Norwood eight years ago and now ocupies 17½ acres of ground, and has 400,000 square feet of floor space. It employes 1,800 hands, with a payroll of about $60,000 per month. It is a branch of the Allis-Chalmers Co.

The object of these excursions is to give the business men of Cincinnati an opportunity to see what growth and progress the city is actually making and to enable them to appreciate what a fine manufacturing center the city is. The work of the bureau is to bring new industries to Cincinnati and to advertise the facilities offered for the location of plants contemplating removal here.

The regular quarterly dinner and meeting of the Cincinnati Branch of the National Metal Trades Association will be held Dec. 6, at the Havlin hotel. The subject of trade schools and the training of the artisan will be treated by President S. C. Dickey of the Winona Technical Institute, and Mr. J. L. Ketchum, of the Brown-Ketchum Iron Works of Indianapolis.

Open and Non-Union Foundries in the United States.

A list of open and non-union foundries has been published by the National Founders' Association, in response to many inquiries received at its office from independent molders and core-makers, as to where they can secure employment without being subjected to union restrictions. The list does not profess to be complete, as it was thought better to insert only plants known to be open or non-union in fact, rather than to include the foundries which are only theoretically open shops. The list is as follows:

ALABAMA.

American Casting Co., Birmingham.
Birmingham Machine & Foundry Co., Birmingham.
Caldwell-Watson Foundry & Machine Co., Birmingham.
Hardie-Tynes Manufacturing Co., Birmingham.
Payne & Joubert Machine & Foundry Co., Birmingham.
Tennessee Coal, Iron & Railroad Co., Birmingham.
Williamson Iron Co., Birmingham.

CONNECTICUT.

Malleable Iron Fittings Co., Branford.
Bridgeport Malleable Iron Co., Bridgeport.
Pacific Iron Works, Bridgeport.
R. E. Parsons Co., Bridgeport.
Wheeler & Wilson Mfg. Co., Bridgeport.
Pratt & Whitney Co., Hartford.
Chas. Parker Co., Meriden.
P. & F. Corbin, New Britain.
Russell & Erwin Mfg. Co., New Britain.
Hudson Foundry Co., New Haven.
Putnam Foundry & Machine Co., Putnam.

GEORGIA.

Fulton Foundry & Machine Works, Atlanta.
Withers Foundry & Machine Co., Atlanta.
Lombard Iron Works & Supply Co., Augusta.
Bowie Stove Co., Rome.

ILLINOIS.

Chicago and Vicinity.

Allis-Chalmers Co., 12th and Washtenaw Ave.
Allis-Chalmers Co., 650 Elston Ave.
American Car & Foundry Co., Wood St. and Blue Island Ave.
American Steel Foundry Co., Chicago Heights.
Brown Bros. Mfg. Co., Chicago.
Butler St. Foundry & Iron Co., 35th and Butler St.
H. W. Caldwell & Son Co., Chicago.
Chicago Malleable Co., Blue Island and Western Aves.
Chicago Ornamental Iron Co., 37th and Stewart Ave.
The Crane Co., Van Buren and Desplaines Sts.
The Crane Co., 51 Judd St.
Dearborn Foundry Co., 1525 Dearborn St.
Deering Harvester Co., 16 Fullerton Ave.
Franklin Foundry Co., 1155 S. Paulina St.
Green Engineering Co., Chicago.
Griffin Wheel Co., Chicago.
Hansell-Elcock Co., Archer Ave. and 23d Pl.
Holmes, Pyott & Co., 13 N. Jefferson St.
Illinois Malleable Iron Co., 515 Diversey Ave.
International Harvester Co., 26th and Blue Island Ave.
Latrobe Steel & Coupler Co., Melrose Park, Ill.
Link Belt Machinery Co., 39th and Stewart Ave.
National Malleable Castings Co., 12th and 52d Ave.
Wm. R. Perrin & Co. (Inc.), 46th and Loomis Sts.
Henry E. Pridmore, 19th and Rockwell Sts.
Pyott Foundry Co., 75 N. Morgan St.
Smeeth's Copper & Bronze Co., 22d and Western Ave.
F. P. Smith Wire & Iron Works, 26 Chester St.
South Halsted Street Iron Works, 2611 S. Halsted St.
Turner Brass Works (Inc.), 122 E. Kinzie St.
Vierling, McDowell & Co. (Inc.), 23d Pl. and Archer Ave.
Western Foundry Co., 3632 Albany Ave.
Winslow Bros. Co.'s Iron & Brass Works, 46th and Harrison Sts.
L. Wolff Mfg. Co., Carroll and Hoyne Aves.
Buda Foundry & Machine Co., Harvey.
Illinois Steel Co., South Chicago.
American Steel Foundries (Inc.), Indiana Harbor, Ind.
North Star Iron Works (Inc.), Hammond, Ind.
The Pullman Co., Pullman, Ill.
Chicago Malleable Castings Co., W. Pullman, Ill.
Piano Mfg. Co., W. Pullman, Ill.
Blakeslee Mfg. Co., Du Quoin.
Kewanee Boiler Co., Kewanee.
Barnard & Leas Mfg. Co., Moline.
Deere & Co., Moline.
Deere & Mansur Co., Moline.
Moline Elevator Co., Moline.
Moline Plow Co., Moline.
Moline Pump Co., Moline.
Moline Scale Co., Moline.
Root & Van Dervoot Engineering Co., Moline.
Williams, White & Co., Moline.
Union Malleable Iron Co., East Moline.

INDIANA.

Anderson Foundry & Machine Works, Anderson.
Ross Supply Co., Anderson.
Wooley Foundry & Machine Co., Anderson.
Seward & Co., Bloomington.
Elwood Iron Works, Elwood.
Atlas Engine Works, Indianapolis.
Chandler & Taylor Co., Indianapolis.
Dean Bros Steam Pump Works, Indianapolis.
Rockwood Mfg. Co., Indianapolis.
Oliver Chilled Plow, South Bend.
Singer Sewing Machine Works, South Bend.
Studebaker Wagon Works, South Bend.

IOWA.

Bettendorf Metal Wheel Co., Davenport.
Red Jacket Mfg. Co., Davenport.
Green Foundry & Furnace Works, Des Moines.
Schreiber & Conchar Mfg. Co., Dubuque.
Monarch Grubber Co., Lone Tree.
Webster City Iron Works, Webster City.

KANSAS.

H. N. Strait Mfg. Co., Kansas City.
Capitol City Iron Works Co., Topeka.
Currie Windmill Co., Topeka.
Topeka Foundry Co., Topeka.
Western Foundry & Machine Works, Topeka.

KENTUCKY.

Henry Vogt Machine Co., Louisville.
Peerless Mfg. Co., Louisville.

LOUISIANA.

J. D. Connell Iron Works, New Orleans.
Killeen's Foundry, New Orleans.
Schwartz Foundry Co., New Orleans.
Shakespeare Foundry Co., New Orleans.
Standard Pulley Mfg. Co., New Orleans.
Whitney Iron Works Co., New Orleans.
W. K. Henderson Iron Works & Supply Co. (Ltd.), Shreveport.

MAINE.

Noyes & Nutter Mfg. Co., Bangor.
Bath Iron Works, Bath.

MARYLAND.

The Maryland Foundry, Cumberland.
Jas. F. Powers Foundry Co., Elkton.

MASSACHUSETTS.

Athol Machine Co., Athol.
American Tool & Machine Co., Boston.
Barbour-Stockwell Co., Boston.
Mechanics Iron Foundry Co., Boston.
Gibby Foundry Co., Boston.
Otis Elevator Co., Boston.
Whittier Machine Co., Boston.
United Shoe Machinery Co., Beverly.
Lamb Knitting Machine Co., Chicopee Falls.
Fairhaven Iron Foundry Co., Fairhaven.
Putnam Machine Co., Fitchburg.
Draper Co., Hopedale.
Holyoke Machine Co., Holyoke.
Chapman Valve Mfg. Co., Indian Orchard.
I. H. Horne & Sons Co., Lawrence.
Lowell Machine Works, Lowell.
A. F. Nichols, Lowell.
Pevey Bros, Lowell.
Milford Iron Foundry, Milford.
Vaughn-Rood Machine Co., Peabody.
General Electric Co., West Lynn.
Arcade Malleable Iron Works, Worcester.
J. A. Colvin, Worcester.
Prespey Pero, Worcester.
Reed Foundry Co., Worcester.
Whitcomb Foundry Co., Worcester.
Worcester Polytechnic Institute, Worcester.

MICHIGAN.

Albion Malleable Iron Co., Albion.
MacKinnon Mfg. Co., Bay City.
American Radiator Co., Detroit.
Detroit Steel Castings Co., Detroit.
Ideal Mfg. Co., Detroit.
Michigan Malleable Iron Co., Detroit.
United States Heater Co., Detroit.
Grand Rapids Malleable Co., Grand Rapids.
Carroll Foundry, Houghton.
Manistee Iron Works Co., Manistee.
The Prescott Co., Menominee.
Enterprise Foundry Co., Muskegon.
Rogers Iron Mfg. Co., Muskegon.

MINNESOTA.

Clyde Iron Works, Duluth.
National Iron Co., Duluth.
Austin Foundry Co., Minneapolis.
Bryant & Lee Co., Minneapolis.
Central Machine Works Co., Minneapolis.
Crown Iron Works Co., Minneapolis.
Diamond Iron Works, Minneapolis.
Flour City Ornamental Iron Works, Minneapolis.
R. R. Howell & Co., Minneapolis.
Kilgore-Peteler Co., Minneapolis.
Kinnard-Haines Co., Minneapolis.
Menzel & Jeffery, Minneapolis.
Minneapolis Foundry & Mfg. Co., Minneapolis.
Minneapolis Steel & Machinery Co., Minneapolis.
Monitor Drill Co., Minneapolis.
Northwestern Foundry, Minneapolis.
Standard Foundry, Minneapolis.
American Hoist & Derrick Co., St. Paul.
South Park Foundry & Machine Co., St. Paul.
St. Paul Foundry Co., St. Paul.
Twin City Iron & Wire Works, St. Paul.

MISSISSIPPI.

W. T. Adams Machine Co., Corinth.

MISSOURI.

Freeman Foundry & Machine Works, Joplin.
Armourdale Foundry Co., Kansas City.
Standard Scale & Foundry Co., Kansas City.
United Iron Works Co., Springfield.
Carondelet Foundry Co., St. Louis.
Green's Car Wheel Mfg. Co., St. Louis.
Scullion-Gallagher Iron & Steel Co., St. Louis.
Whitman Agricultural Co., St. Louis.

NEW HAMPSHIRE.

Sullivan Machinery Co., Claremont.
Flather Foundry Co., Nashua.
Wm. Highton & Sons, Nashua.
Nashua Co-Operative Iron Foundry Co., Nashua.

NEW JERSEY.

Cox & Sons Co., Bridgeton.
Thos. Devlin Mfg. Co., Burlington.
John H. Dialogue & Son, Camden.
Garwood Foundry & Machine Co., Garwood.
Arthur E. Barlow, Newark.
Meeker Foundry Co., Newark.
Empire Foundry Co., New Brunswick.
John Waldron Co., New Brunswick.
Ingersoll-Sergeant Drill Co., Phillipsburg.
Walter Scott & Co., Plainfield.
Crossley Mfg. Co., Trenton.
Trenton Malleable Iron Co., Trenton.

NEW YORK.

Wiard Plow Co., Batavia.
Jones of Binghamton, Binghamton.
Brown & Patterson, Brooklyn.
Charles A. Lefferts & Co., Brooklyn.
Acme Steel & Malleable Iron Works, Buffalo.
Alloys Foundry Co., Buffalo.
American Brake Shoe & Foundry Co., Buffalo.
American District Steam Co., Buffalo.
American Radiator Co., Bond Plant, Standard Plant.
Brown Car Wheel Works, Buffalo.
Buffalo Car Wheel & Foundry Co., Buffalo.
Buffalo Crucible Castings Co., Buffalo.
Buffalo Radiator Co., Buffalo.
Buffalo Scale Co., Buffalo.
Farrar & Trefts, Buffalo.
Fillmore Avenue Foundry & Iron Works, Buffalo.
Fries & Co., Buffalo.
Howard Iron Works, Buffalo.
Lumen Bearing Co., Buffalo.
New York Car Wheel Co., Buffalo.
Niagara Radiator Co., Buffalo.
Pratt & Letchworth Co., Buffalo.
Sherwood Mfg. Co., Buffalo.
United States Cast Iron Pipe & Foundry Co., Buffalo.
Zero Valve & Brass Mfg. Co., Buffalo.
Patten & Stafford, Canastota.
United States Radiator Works, Dunkirk.
Field Force Pump Co., Elmira.
Dilts Machine Works, Fulton.
The Herendeen Mfg. Co., Geneva.
Remington Typewriter Works, Ilion.
Bickford & Huffman Co., Macedon.

Abenroth & Root Mfg. Co., Newburg.
Coldwell-Wilcox Co., Newburg.
Central Foundry Co., New York.
The Kennedy Valve Mfg. Co., New York.
Abendorth Bros., Port Chester.
Pneumatic Signal Co., Rochester.
The Cast Thread Fitting & Foundry Co., Seneca Falls.
Isaac G. Johnson & Co., Spuyten Duyvil.
E. C. Stearns & Co., Syracuse.
Syracuse Aluminum & Bronze Co., Syracuse.
Syracuse Chilled Plow Co., Syracuse.
Syracuse Malleable Iron Co., Syracuse.
Troy Malleable Iron Co., Troy.
West Side Foundry Co., Troy.
Giblin & Co., Utica.
International Heater Co., Utica.
Standard Harrow Co., Utica.
Utica Heater Co., Utica.
Utica Pipe Foundry, Utica.
Bagley & Sewell Co., Watertown.
The Harmon Machine Co., Watertown.

OHIO.

Stirling Consolidated Boiler Co., Barberton.
Watt Mining Car Wheel Co., Barnesville.
Carroll Foundry & Machine Works, Bucyrus.
The Buckeye Foundry Co., Cincinnati.
John Douglas Co., Cincinnati.
The I. & E. Greenwald Co., Cincinnati.
The Victor Knecht Co., Cincinnati.
The John B. Morris Foundry Co., Cincinnati.
The Samuel C. Tatum Co., Cincinnati.
Acme Foundry Co., Cleveland.
Ohio Foundry & Mfg. Co., Cleveland.
The Otis Steel Co., Ltd., Cleveland.
The Standard Car Wheel Co., Cleveland.
Superior Foundry Co., Cleveland.
Taylor & Boggis Foundry Co., Cleveland.
The Variety Iron Works Co., Cleveland.
Walworth Run Foundry Co., Cleveland.
Westinghouse Electric & Mfg. Co., Cleveland.
Buckeye Steel Castings Co., Columbus.
Carlisle, Shilling & Shilling, Columbus.
Chase Foundry & Mfg. Co., Columbus.
Hance Casting Co., Columbus.
P. Hayden Saddlery Hardware Co., Columbus.
Jeffrey Mfg. Co., Columbus.
Kinnear Mfg. Co., Columbus.
McDonald Bros., Columbus.
U. S. Cast Iron Pipe & Foundry Co., Columbus.
C. S. Bell Co., Hillsboro.
The Champion Iron Co., Kenton.
Lorain Foundry Co., Lorain.
Humphreys Mfg. Co., Mansfield.
Bettendorf Metal Wheel Works, Springfield.
Fairbanks Machine Tool Co., Springfield.
The Foos Mfg. Co., Springfield.
O. S. Kelly Co., Springfield.
Wickham Piano Plate Co., Springfield.

PENNSYLVANIA.

Allentown Foundry & Machine Co., Allentown.
American Bridge Co., Ambridge.
Catasaqua Castings Co., Catasaqua.
Lehigh Car Wheel & Axle Co., Catasaqua.
Columbia Grey Iron Co., Columbia.
Easton Foundry & Machine Co., Easton.
Ingersoll-Sergeant Drill Co., Easton.
Erie City Iron Works, Erie.
Erie Foundry Co., Erie.
Walker Foundry Co., Erie.
Lehigh Foundry Co., Fullerton.
Hazleton Iron Works Co., Hazleton.
Jeanesville Iron Works Co., Hazleton.
Carbon Steel Castings Co., Lancaster.
Hubley Mfg. Co., Lancaster.
Lehighton Foundry & Machine Co., Lehighton.
Marietta Castings Co., Marietta.
Marietta Hollow Ware & Enameling Co., Marietta.
Meadville Malleable Iron Co., Meadville.
Gray Iron Casting Co., Mt. Joy.
Baldwin Locomotive Works, Philadelphia.
Mr. James Barker, Philadelphia.
Bement Miles & Co., Philadelphia.
Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia.
George V. Cresson Co., Philadelphia.
Dienelt & Eisenhardt, Inc., Philadelphia.
Enterprise Mfg. Co., Philadelphia.
Harrison Safety Boiler Works, Philadelphia.
Midvale Steel Co., Philadelphia.
Moore & White Co., Philadelphia.
Schaum & Uhlinger, Philadelphia.
William Sellers & Co., Philadelphia.
Southwark Foundry & Machine Co., Philadelphia.
Tioga Foundry Co., Philadelphia.
Williamson Brothers Co., Philadelphia.
The Exeter Machine Works, Pittston.
Stanley G. Flagg & Co., Pottstown.
Drummond Iron Works, Ltd., Reading.
Allis-Chalmers Co., Scranton.
F. S. Barker Co., Scranton.
Finch Mfg. Co., Scranton.
McClave-Brooks Co., Scranton.
Scranton Foundry & Machine Co., Scranton.
Scranton Steam Pump Co., Scranton.
Touhill Iron Works, Scranton.
Bethlehem Steel Co., South Bethlehem.
Eagle Iron Works, Tamaqua.
Tamaqua Mfg. Co., Tamaqua.
Hermance Machine Co., Williamsport.
York Mfg. Co., York.

RHODE ISLAND.

A. Carpenter & Sons Foundry Co., Providence.
Miller Iron Co., Providence.
C. B. Cottrell & Sons Co., Westerly.

TENNESSEE.

Blacklock Foundry, South Pittsburg.

TEXAS.

Alamo Iron Works, San Antonio.
Collins-Gunther Co., San Antonio.

WISCONSIN.

Beloit Iron Works, Beloit.
Fairbanks-Morse Mfg. Co., Beloit.
The A. W. Stevens Co., Marinette.
Allis-Chalmers Co., Milwaukee.
Thomas Ashton & Sons Co., Milwaukee.
Bucyrus Co., Milwaukee.
J. A. & P. E. Dutcher Co., Milwaukee.
Falk Co., Milwaukee.
Filer & Stowell Co., Milwaukee.
B. Hoffman Mfg. Co., Milwaukee.
Milwaukee Steel Castings Co., Milwaukee.
National Brake & Electric Co., Milwaukee.
Stowell Mfg. & Foundry Co., South Milwaukee.
Vilter Mfg. Co., Milwaukee.
Western Malleable & Grey Iron Mfg. Co., Milwaukee.
The J. I. Case Plow Works, Racine.
The J. I. Case Threshing Machine Co., Racine.
Pawling & Harnischfeger, Milwaukee.
F. M. Prescott Steam Pump Co., Milwaukee.
R. J. Schwab & Sons Co., Milwaukee.
Sheriffs Mfg. Co., Milwaukee.
Geo. H. Smith Steel Casting Co., Milwaukee.
Superior Iron Works, West Superior.

ONTARIO.

Crowe's Iron Works, Guelph.
Taylor-Forbes Co., Guelph.
The Frost & Wood Co., Smith's Falls.
Canada Foundry Co., Ltd., Toronto.
Ontario Wind Engine & Pump Co., Toronto.

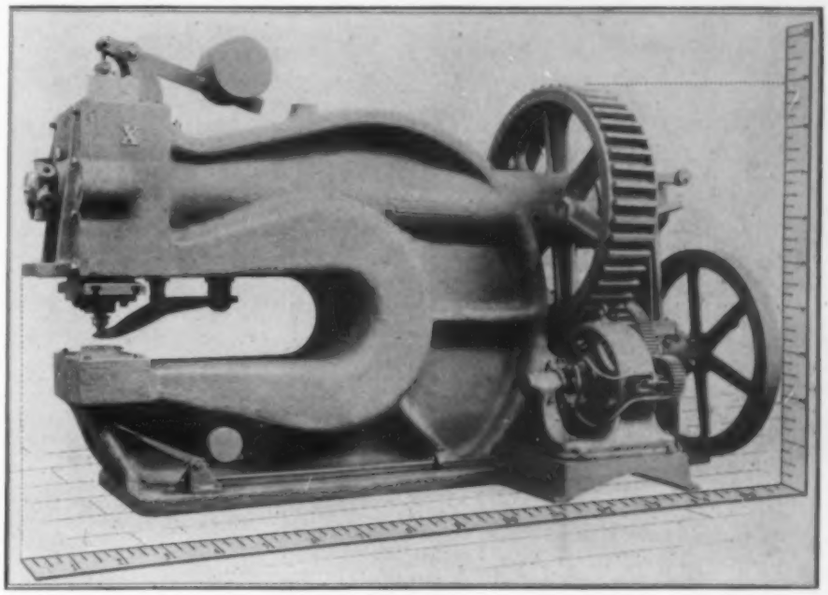
QUEBEC.

Allis-Chalmers-Bullock, Ltd., Montreal.
Warden, King & Son, Ltd., Montreal.

The Pennsylvania Railroad Co., it is announced, will soon start work on a power plant and dam at Iroquois, about 20 miles west of Harrisburg, Pa., to supply telegraph and signal towers and to operate cars from Aqueduct to Mifflin, Pa. A plant for the manufacture of cars and electric engines may be erected at Harrisburg.

SPECIAL HEAVY PLATE SHEAR.

The Cleveland Punch & Shear Works Co. of Cleveland, has just built a machine for handling the heaviest work able to be undertaken in its line. The accompanying illustration is a view of a 60-inch throat heavy plate punch or shear which has a capacity for making a 24-foot cut in 1½-inch plate as a shear or can punch a four-inch hole in 1½-inch plate. The plunger is built with extra thickness to allow for large and ample surface for fastening the various kinds of tools. It has a taper brass gib the full width of the head and for the absorption of the shock it is attached by means of a spring connection to a counterweight. For handling material to and from the



HEAVY PLATE PUNCH AND SHEAR.

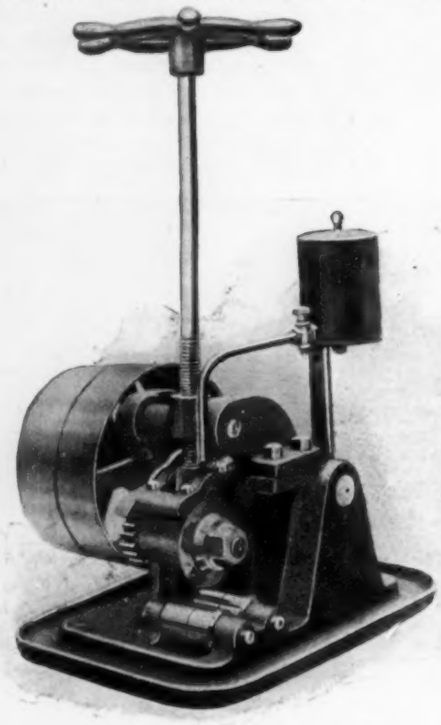
machine, the top of the frame is furnished with a boss into which can be fitted a trunnion for setting up a swinging gib crane.

The latest construction has been used in designing and building the main frame which is of the solid frame type, a special point having been made of the distribution of material in the design, from the standpoint of economy, a fact which is reflected in the cost of the machine. The material is of a high grade strong iron, especially adapted to this class of machinery. The punch is fitted with the regular automatic steel casting clutch with an adjustable cam ring for stopping it at any point of its stroke. The size of the machine has been reduced to a minimum, particularly in the matter of length which has been decreased by shortening the tail piece.

The tool is driven by means of spur gears, the train having a ratio of 16 to 1, and the power is furnished by a direct-connected 25-horsepower motor.

A NEW ROLLING PIPE CUTTER.

Bignall & Keeler Mfg. Co. of Edwardsville, Ill., have recently placed on the market an improved rolling pipe and tube cutter in which the cutter shaft is driven direct from the driving shaft by means of cut gears. This is shown in the accompanying illustration. The cutter is raised or lowered by means of a screw working in a steel nut. The rollers are of large diameter, which reduces the speed. They run on hardened steel pins.



New Rolling Pipe Cutter.

The cutter disc is made of the best tool steel, carefully tempered, and stiffened by a pair of steel flanges. An oil tank and pan are furnished, so that oil may be used if desired. The machines are made in two sizes: No. 1, cutting from ¼ inch to 2 inches, and No. 2, cutting from 1 inch to 4 inches.

The railroad companies have perhaps never paid so much attention to the safeguarding of their tracks as they are doing at the present time. A contract has been placed for the installation of the automatic block signal by the Boston & Maine R. R. with the Union Switch & Signal Co., calling for all the material necessary to cover the equipment of the signal over at least one thousand miles of track in the immediate future.

The Clark mine at Chisholm now has four shafts.

IRON AND STEEL WORKS OF MEXICO.

Considerable data in regard to the iron and steel situation in Mexico has been collected by Consul-General Gottschalk, of the City of Mexico, who makes the following report:

Native pig iron does not appear to have made its appearance upon the market until some three years ago. The only reason that I can find for this seems to be that the lack of proper fuel makes ironworking extremely expensive. I am told that it averages between 5 and 30 Mexican pesos ($12.55 and $14.94) per ton, and that therefore it proves cheaper to import pig iron used in Mexico that at present about three-quarters is imported from England and that a very small percentage comes from the United States. Some ten years ago, while Mexico was yet in the beginning of its railroad history, the railroads sold their "scrap" to whomsoever would buy for remelting. Steel could not be worked here in those days, and all the old railroad steel appears to have been sold at Tampico for sometimes less than the freight from Tampico to Mexico City.

There is a steel plant in Monterey called the "Fundicion de Fierro y Acero de Monterrey," whose president is an Italian, and whose paid up capital (said to be 10,000,000 Mexican pesos, or $4,980,000 United States currency) is principally Mexican. This company has been a factor in the national development of the industry, by being the means of obtaining the greater protective duties on rails and building material. They make rails, and, generally speaking, all sorts of steel work, but their chief output, I am told, is structural steel.

There are ironworks manufacturing wrought iron and mild steel, at Chihuahua (Compania Industrial de Chihuahua); at Durango (Compania de Fierro Nacional, with an American in charge); Ricardo Honey's works, near Pachuca, backed by combined Mexican and English capital; and the Mexican Central railroad, at Aguascalientes, has a mill of goodly proportions, where it rerolls all its old wrought iron into bars, bolts, and structural material, such as truss rods, brake beams, etc.

There are a number of cast-iron works in the City of Mexico, prominent among which are two large concerns — the National Iron & Steel Works (American) and Thomas Phillips & Co. (British), besides a number of smaller Mexican works. There are a number of similar concerns of varying importance scattered throughout the republic and using scrap or pig iron imported from Monterey. The International railroad, at Ciudad Porfirio Diaz, has furnaces where axles and car wheels are made for its own service.

In the course of an investigation upon iron, one cannot fail to hear of the singular "Iron Mountain" of Durango, a hill which analyzes an enormous percentage of pure iron, unfortunately showing so high a percentage of sulphur that it cannot as yet be profitably worked.

I find that brass is worked in Mexico from copper and zinc imported from the United States and tin from England. Copper mattes are shipped to the United States from Mexico, and Mexico imports copper from the United States. This, I am told, is due to the absence of proper reduction plants here. Copper wire is imported largely from the United States in its commercial form as wire.

INDUSTRIAL EDUCATION.

Through the efforts of the Society for the Promotion of Industrial Education, wide attention is being directed to this increasingly important subject. A meeting was recently held at Cooper Union in New York at which a number of prominent speakers were present, one of whom said:

"This country has grown to its leading position among the nations of the world, not on account of its military victories and subsequent territorial expansion, but on account of its industrial achievements. Anything which will further the possibilities of still greater industrial development is therefore economically important and eminently patriotic. It is for this reason that I view with great satisfaction the formation of a "Society for the Promotion of Industrial Education," believing that a broader industrial training of the masses in conjunction with natural American business sagacity and mechanical ingenuity, will furnish us an irresistible weapon in the battle of competition in world markets.

THE PROBLEM OF MINING SANDY ORE AT COLERAINE.

TWO MODEL TOWNS BEING BUILT BY STEEL CORPORATION.

Methods of Washing Ore Being Perfected.—Large Developments Probable.—Unique Conditions.

Until the first of September when the branch of the Duluth, Missabe & Northern railroad was open for traffic from Alborn to Coleraine, and communication was made more easy, the work that the United States Steel Corporation is doing on the western Mesabi was more or less misrepresented. Because of the nature of the ore in this location, because of the isolation of these workings from the remainder of the Mesabi range and because of the intention of the operating company to build here a model location, the mining and development at Bovey and Coleraine have been considered novel, unique and unusually interesting. The operations, have these characteristics, though not perhaps in the degree represented, but more in that splendid work is being done and plans are being followed out which will involve some undertakings that have not been tried elsewhere on the range.

The first exploring in this section was done for the Congdon and Hartley interests in 1903. Ore was struck almost at once, and the land was leased by the exploring parties under the name of the Canisteo Mining Co. No. 1 shaft was sunk two years ago in April, and a shaft was also put down about four months later at what was named the Holman mine, an exploration likewise undertaken by Congdon and Hartley. Two years ago, J. M. Longyear started the town of Bovey, of which a view of the main street is shown in the accompanying illustration, much as it appears now. January 1, 1905, the Oliver Iron Mining Co., acquired all the leases in this territory, involving the newly opened up property and the old Diamond and Arcturus mines. A shaft was sunk at the Diamond mine about 14 years ago, but ore had never been shipped from there. The Arcturus had been explored, but no shaft was sunk and probably neither of these mines will be further worked for a considerable time to come.

Now operating under the name of the Hope Mining Co., the Oliver Iron Mining Co. sank a No. 2 shaft at Canisteo in the spring of 1905, which is 190 feet deep and is the farthest down of any of the shafts. No. 3 shaft was sunk in the spring of this year. The Canisteo, Holman, Diamand and Arcturus mines occupy a section running diagonally northeast across the township 55, range 24, following the general direction of the Mesabi formation. Canisteo is the most southerly, being located in section 30. The Holman is about three miles to the northeast in section 21 and the other two are still farther to the northeast.

FIG. 1.—MAIN STREET BOVEY.

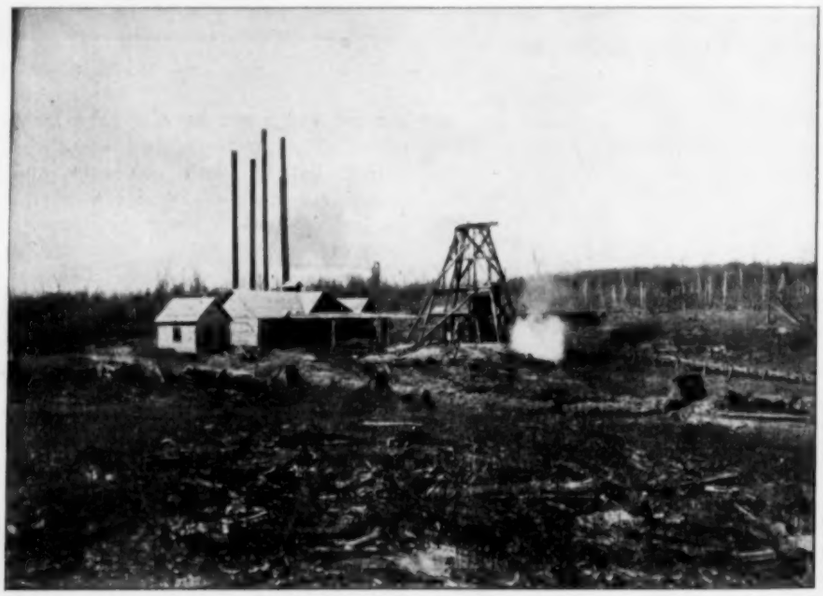
While the name Bovey has characterized the location, it is Coleraine a half mile away that will be the town of the future and the one which the

FIG. 2.—PANORAMIC VIEW OF COLERAINE.

Steel Corporation intends to make its model mining town. The work of building Coleraine was started at the beginning of this year, and the general view of the town site is shown in part on the preceding page. The town, of course, lies on non-ore bearing land owned entirely by the Hope Iron Mining Co., which company exercises entire control of the sale of property and of the regulations governing the uses of that land. The streets are laid out in squares and named with one exception after prominent men connected with the United States Steel Corporation, the two main streets intersecting at the center of the town being called, respectively, Roosevelt and Corey avenues. Forty-two houses of 15 different designs have been or are in the process of erection beside several stores in the main street. An $80,000 school building is being put up and a $10,000 bank building and an $18,000 hotel are in immediate prospect. In buying town lots, the purchaser agrees to build thereon within a year, and in renting the houses which the company owns $1.00 is charged per month for every $100.00 of the cost of the dwelling, so that a $1,500 house will rent for $15.00 a month. Various restrictions intended to preserve a desirable atmosphere about the town have been established and all evidence points to an unusual condition of affairs, as mining towns in a new country go. At present, the conveniences are somewhat limited, though the homes of General Superintendent J. C. Greenway, Superintendent H. C. Dudley, of the Canisteo mine and Engineer C. H. Claypool are picturesque log cabins, as shown in the picture we have obtained.

LOG CABIN DWELLINGS FOR THE SUPERINTENDENTS.

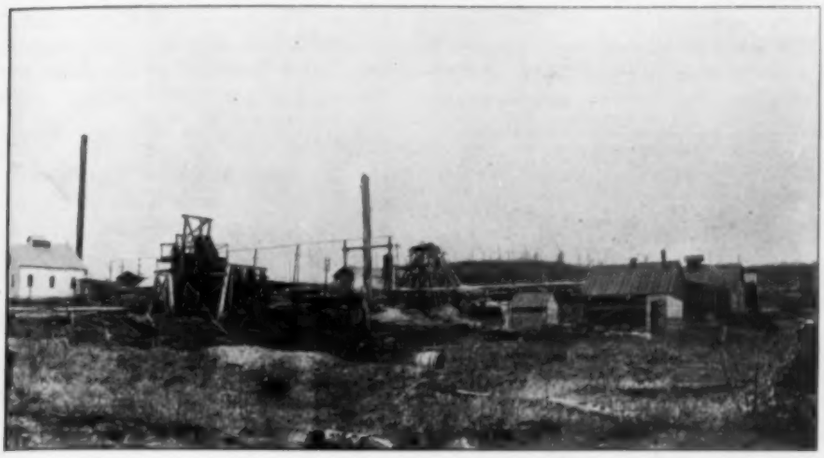
A plan similar to the one on which Coleraine is being erected as the mining town for the Canisteo location, is being followed out at the Holman mine, where L. R. Salsich is the superintendent in charge, and there the town of Holman is being built. The mining at both mines, while similar in most respects, also has its differences. The uniqueness of the work in both locations, is that western Mesabi ores have running through them veins of sand, which, in taking out the ore, become so mixed with it that the only process of separation is by washing. This washing will have to be done at both the Holman and Canisteo mines but in far greater proportion at the Canisteo mine. In fact, all the ore there will have to be washed. The difference between the quantity of sand at these two mines indicates that the farther west on the Mesabi range, the more frequent is the occurrence of the sandy veins, and the Holman mine seems to be located at whatever boundary there may be between ores containing sand and those free from it, because a deposit of something like 2,000,000 tons has been found at the Holman which is entirely free from sand and which will as a result need no washing process. At both mines, the ore will be taken out from underground and from open pit. Views of the shafts at both Canisteo and Holman are shown in the accompanying illustrations, and sketches of the plan of opening the stripping propositions and the extent to which the work had been carried at the end of October are presented. The necessity for working part of the deposit underground results from the usual well-known causes, depth of over burden and presence of taconite capping.



ONE OF THE SHAFTS AT CANISTEO.

The Holman pit possesses many natural advantages, both as to the lay of the pit and the possibilities for dumping and stripping, similar in some respects to the Stephens mine on the eastern end of Mesabi, concerning which comment has already been made. The Holman lies on the side of a hill, enabling much of the

stripping to be taken out without a grade. The depth of the over burden varies from 17 feet near the approach, at which point the excavating has been carried down to ore, to 60 feet at the upper end of the pit on the hill. Two shovels were working in the Holman pit, and the work so far gave prospect of resulting in a very advantageous opening of the deposit. The same ridge, upon the side of which the pit lies, extends to the eastward, rising higher, so that by making a cut in the side of the hill the track could be laid along the slope at a considerable height above the marshy level at the foot, so that a dump may be built out from the ridge with a natural height of close to 60 feet. The stripping is nearly all of sand and gravel, which makes a fairly firm foundation for the tracks. While starting the dump, the stripping tracks were, of course, very crooked, conforming with the contour of the ridge, but as the width of the dump has increased, they have been straightened out, so that next year at least, conditions should be extremely favorable.



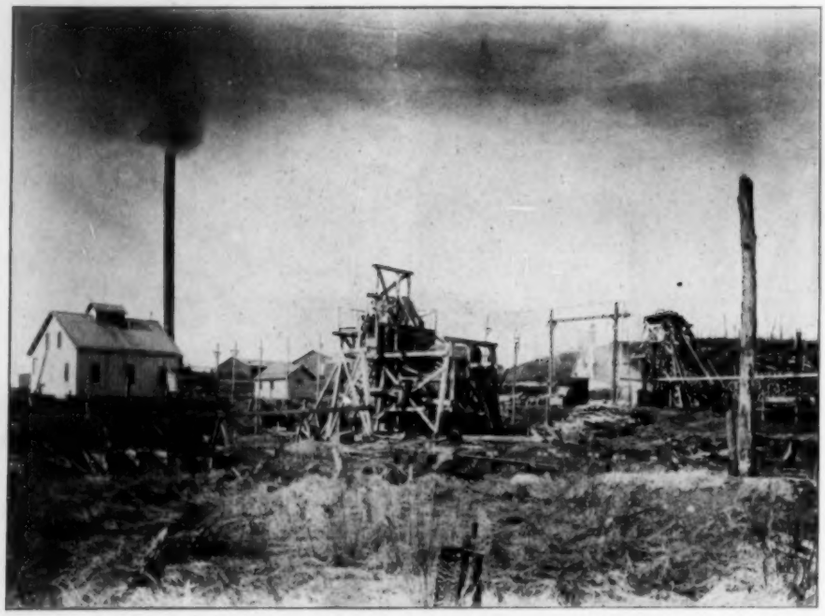
General View Holman Mine.

Canisteo Shaft.

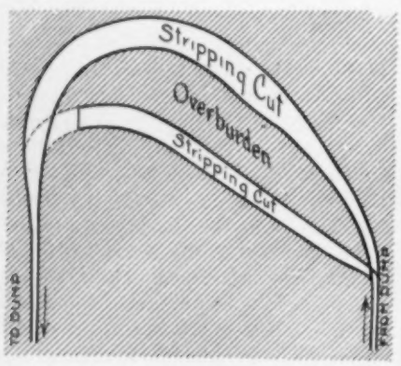
No. 3 Shaft at Canisteo.

In addition to this, there is a drainage to the marshy land into which the dirt is being dumped, and it is proposed to try the flushing process which was so successfully operated at the Leetonia mine. By this means, where a large stream of water is used to wash the dirt down the side of the dump, approximately 3,000 yards of dirt may be unloaded in one place without moving the tracks, which means a large saving in labor. At the Canisteo mine, the reverse condition has been true, and will probably be so for some little time, or until the dump is considerably larger than at present. As is well known, this end of a stripping proposition is one of the most difficult, especially when all of the shovels digging are in blue clay and muskeg swamp. Not only was a considerable quantity of the stripping at the Canisteo of this material, but the dump had to be built out for a considerable area before any great height was obtained, and in addition, the run from the pit to the dump was pretty long. Three dumps are being built at Canisteo which relieves the situation somewhat, but out to the farthest of them from the pit is nearly two miles. The plans of opening up the deposits at both locations are somewhat different, as shown by accompanying sketches, the Holman being opened up in circular form, the one approach to serve permanently, while at the Canisteo, the land is level and two cuts have been made, as shown, with two approaches, so that the stripping will be carried right through the pit instead of backing out. The over burden will be removed so that the two through cuts will run into each other, forming one continuous opening. At both properties standard stripping

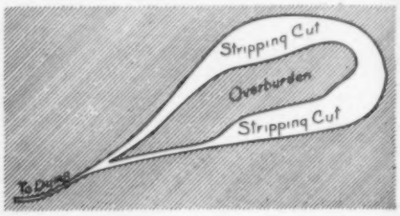
equipment is being used, there being five 60-ton locomotives at the Canisteo and four 60-ton locomotives at the Holman, with 7 yard cars. The stripping in both pits was started in July, the first trip over the branch from Alborn being made to bring the shovels out. Some rapid work was done in setting up, for the first shovel was put together and ready to dig at the Holman in 11 hours after it arrived, and at the Canisteo, the shovel was ready for work in eight hours after its arrival. The stripping at the Canisteo is heavier than at the Holman, being as much as 90 feet deep in parts, and averaging in all close to 70 feet. At the end of October about 75,000 yards had been taken from the Holman pit and a slightly smaller amount from the Canisteo.



Closer View of Old Washing Machine.



The washing of the ore will, of course, be the distinctive feature of western Mesabi mining. The ores from these sandy deposits when stocked look much as other ore does in stock pile with a light snow fall over it, the sand giving the ore a streaky white appearance. The ore itself, apart from the sand, is of Bessemer grade at both the Holman and Canisteo locations, and after being washed, it is of a physical structure excellent for furnace purposes. The tailings from the washing machine or sand, constitute about 24 to 30 per cent of the material mined. The sand is simply mechanically mixed and is separated by a gravity process. After being washed, the ore runs from 50 to 58 per cent in iron. Some of the ore has been washed at the Holman mine in a small, temporary machine that is there, a view of which is shown. At the Canisteo mine, a trial washing apparatus is now being erected, the accompanying view showing the location and size of the plant and the progress of construction. This



one plant has been built in the side of a hill near the end of Trout lake, it being the idea at both mines to run the tailings out into the lake. However, the present trial plant is only temporary, and the permanent one will be located on the other side of the lake.

The experimental washing machine differs somewhat from the construction intended for the permanent plant. It is being built of 10 x 12 timbers, while the permanent installation will be erected of steel and concrete. The one now being put up is to have a capacity of 1,000 tons a day, while the one to be built, when the numerous changes found desirable are determined upon, will consist of ten units of the same size as the temporary plant. As it is located now, the plant consists of a large bin, the top of which is on a level with tracks running parallel with the dump and carrying the ore from the mine.

The Temporary Washing Plant at Canisteo.

These tracks run over the bin and the ore is dumped from the cars through it into a single shell conical screen, a chute from bottom of the bin leading into the smaller end of the screen. This screen is 14 feet long and about 2½ feet in diameter at the small end and is provided with bearings, so that it rotates on four rollers. The screen has two-inch perforations and a spray of water is introduced at the small end. Parallel with this circular screen and at the same height is a log washer consisting of a single rotating shaft with short projecting arms. The ore, as it enters the screen and is both washed by the water spray and rotated around the screen, is separated, the hard large lumps being carried out of the big end on to a picking belt and the finer particles washed out through the perforations into the log washer alongside. The picking belt is 28 feet 8 inches long and carries the ore out horizontally to a point where it may be dumped into a bin or hopper leading down into the hoisting skip. It is intended that a man will stand alongside of the picking belt separating the lumps of taconite and rock from the good material. The finer ore which passes through the log washer proceeds to a double incline cylinder screen, which is 12 feet long. This screen effectually separates the fine ore from the sand, the washing process continuing. The mouth of this last screen discharges the ore into the same hopper which also receives the larger lumps from the picking belt. From the bottom of this receiving hopper a hoist has been built up to the level of the tracks above and a 50-ton skip is to be installed. The horizontal over-all dimension of the plant is 87 feet and the lift from the bottom to the top is 73 feet 3 inches. The permanent plant, instead of being located, as this one is, in the side of a hill will be built up in the air, and the ore as mined will be pushed up on the trestle to the top of the receiving bin and loaded directly into the shipping cars at the bottom. There will be a permanent plant at both the Holman and Canisteo mines. Sufficient experimenting has been done with the old machine at the Holman and elsewhere to assure a successful separation of the sand from the ore, and the present experimental plant is being built upon a basis of practical working value, so that beyond the changes that will be found advantageous in a mechanical way the process seems probable of all the success hoped for.

While predictions have been made that ore will be shipped from here at the beginning of next season, there seems no probability, on the ground, of ore being shipped before the first of 1908, both on account of the mining operations and the fact that the facilities for washing the ore will scarcely be ready until that time. There are about 400 men employed at Coleraine at present, and there is every reason to believe that with the probable opening up of the Hill-Walker lands adjacent in the near future, the operations in that district will become all that some of the misinformed have already claimed for them.

A NEW FOUNDRY FLASK.

All foundrymen are familiar with the shortcomings of the snap flask and know how frequently snap flask work is spoiled on account of run-outs which result not only in loss of castings, but in burning of the bottom boards. To overcome these difficulties the MacPhail Flask & Machine Co., 1270 Monon Bldg., Chicago, Ill., has brought out a new form of flask, which is shown in the accompanying illustrations. It is made entirely of sheet steel. Cope and drag have a uniform taper toward the bottom board. To hold the sand in the cope while it is being turned over, a series of projecting lugs or fingers are provided near the parting line of the flask; these are controlled by the levers shown at the ends of the cope part of the flask. By depressing the levers a short distance, the lugs are withdrawn, thus releasing the sand. After the mold is completed the sand is released and the flask, on account of its taper form, easily lifted off.

FIG. 1.—COPE OF MACPHAIL FLASK.

To support the sand during pouring a sheet steel jacket, made of metal of the same thickness as the flask, and having exactly the same taper is dropped about the mold. This supports the sand perfectly at all points and makes it possible to place the casting very close to the outside edge of the flask. In other words, this arrangement gives the advantage of a complete steel flask without its attendant expense.

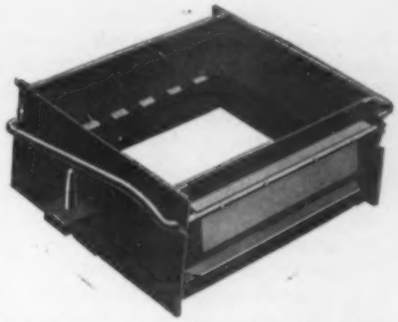


FIG. 2.—THE COPE AND DRAG OF MACPHAIL FLASK COMPLETE.

The jackets can be readily removed from one mold to another so that it is claimed that where 125 molds per day are put up on a machine it is only necessary to have one of the MacPhail self-releasing flasks and six steel jackets. The jackets being self-releasing are moved from one mold to another as they are successively poured.

FIG. 3.—JACKET USED IN CONNECTION WITH MACPHAIL FLASK.

Alzen, a New Metal. — "Alzen is the name given to a new metal, which is composed of two parts of aluminum and one part of zinc," writes Consul-General Guenther from Frankfort. "It is said to equal cast iron in strength but is much more elastic. Alzen is superior because it does not rust as easily as does iron and it takes a high polish. Besides being very strong this new metal is capable of filling out the most delicate lines and figures of forms in castings."

Percentage of carbon.	Commencement to solidify. Degrees Fahr.
4.3	2,080
4.0	2,144
3.0	2,330
2.0	2,395
1.0	2,632
0.0 pure iron.	2,740

FREDERICK REMSEN HUTTON.

Sketch of the Vigorous Career of American Society of Mechanical Engineers' Next President.

With Prof. Hutton in the presidential chair and Calvin Rice filling the office of secretary, the American Society of Mechanical Engineers can look forward to a year of unexampled prosperity. The enterprise and the genius for organization of the man to whom Columbia University is indebted for her magnificent engineering laboratories will be invaluable to the society during the coming months when the libraries and offices will be removed to the fine quarters in the new Carnegie building, and the conscientious Mr. Rice may be depended upon to look after every minute detail with the care it deserves.

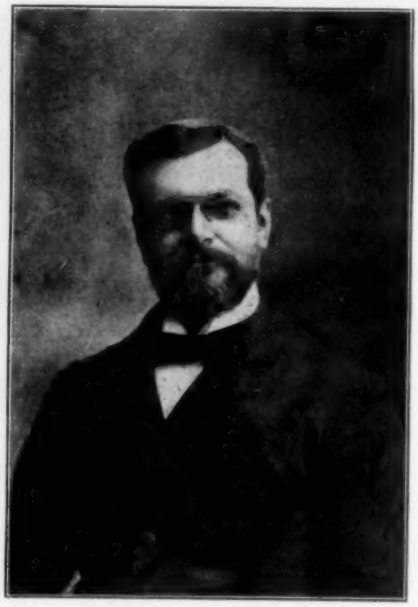
Frederick Remsen Hutton was born in New York city, May 28, 1853. He comes from Holland stock, on his father's side from the old families of the Troy district and on his grandmother's side from those of the Ulster county region, the Van Wycks and Brinkerhoffs of that section being among his ancestors.

After preparation in a private school in New York, he entered Columbia college, receiving the degree of A. B. in 1876, and then entered the School of Mines, taking its degree in 1876. One year thereafter he was appointed as instructor in mechanical engineering, as an associate of the late Prof. W. P. Trowbridge. He entered the faculty as adjunct professor in 1881, and became full professor in 1890.

On the death of Prof. Trowbridge in 1892, the chair of engineering which he had occupied, was divided, and professorships in civil engineering and electrical engineering were added to the already existing professorships of mining and mechanical engineering. Since that time to the present, Professor Hutton has been the head of the mechanical engineering department.

Perhaps his most significant achievement during these years of service has been the development of the great mechanical laboratories of the university, during the period from 1897 to 1900, just subsequent to the transfer of the institution to its present location on Morningside Heights. This equipment covers the Baldwin Locomotive mounted upon its testing equipment, the triple-expansion Allis-Reynolds engine, which is a three-stage air compressor, and the hydraulic equipment of the Henry R. Worthington laboratory. A conservative estimate of the value of this equipment as installed, is not far from $100,000.

Prof. Hutton has held the theory that to make experiments in illustration or confirmation of engineering formulae on engines or machines of small size is to introduce an error not only of degree but of kind, and that therefore the units should be of sufficient size to guard against this difficulty and, furthermore, to make research into new fields sufficiently near to the actual conditions of practice so as not to prove actually misleading when their results were applied. The air compressor has been a very favorite form of laboratory apparatus by reason of its illustrating to the student the complete cycle of generated mechanical energy in compressed air, and the liberation of that energy in a motor having exactly the same cycle as the original steam cylinder. While other institutions have perhaps more extended equipment, there are none which have any larger units than those here assembled.



FREDERICK R. HUTTON, PH. D. SC. D.

Professor Hutton is also an earnest exponent of such a method of conducting laboratory instruction as to compel the student to exercise his thinking faculty, not only in devising the experiments and connecting up the apparatus, but in the interpretation of the results. In his discussion of this subject he has referred to the more formal system of definite instruction to the students by the use of printed logs which can be used one-half automatically as failing to make men out of the raw material. The automatic or log method he has called "the cook book system." Columbia has honored his achievements both within its walls and outside, by giving him first the honorary degree of Ph. D. and later, on the occasion of its 150th anniversary, the degree of Sc. D., which is the highest that it confers in the fields of science.

In 1883 the American Society of Mechanical Engineers felt called on to make a change in its secretary. The society had then been in existence for three years and was feeling the embarrassment of the young society, both financially and in other directions, which belong to that period of its life. The choice of the council fell upon Prof. Hutton and he began, renting his own office at No. 117 Cortlandt street and employing a clerk to operate the office and attend to routine. This clerk's salary he also paid out of the meagre compensation of that day. The society seemed to feel at once the infusion of new energy and began a career of advancing prosperity under successive presidents. The work outgrew the modest first office and was then moved to the Stewart building from which again the growth of the library forced it to larger quarters at 67 Madison avenue.

It was the secretary's energy and ambition which compelled the conservative council of that day to give favorable consideration to the project of purchasing the house at No. 12 West Thirty-first street, New York, in 1890. The sale of that house at twice the purchase price of sixteen years ago is a gratifying confirmation of the financial wisdom of the step which was then taken. The secretary was the responsible factor in arranging the details of the trip of the society to England and France in 1889, which was the first undertaking of its sort and which appeared to be of such great benefit in giving international position and recognition to the society. The society chartered an entire steamer for its use on the way over, and those who took part in the trip are still full of pleasant memory.

Prof. Hutton has been an active member of the trustees and building committee appointed by the Society of Mechanical Engineers for the consideration of the problems raised in connection with the building of the engineering societies, the gift of Andrew Carnegie in 1904. He has been the secretary both of the building committee and of the trustees who constitute the holding corporation for the societies. He has given much time and thought to the problems brought up in the planning of the building and in the consideration of much detail which could not be considered in the larger body. He resigns the secretaryship of the society at the threshold of the new building and just as the society enters into the new phase of its existence, which will be the result of the conditions at the Thirty-ninth street site. He will be the first president of the society under these new conditions.

From the nature of his duties in Columbia university and in the society's office, with their complete absorption of his available time, it has been impossible for Prof. Hutton to undertake any very considerable creative work in engineering practice or in the consulting field. His contributions to engineering have therefore been restricted to work of an expert before the courts and in patent cases and as a contributor to the scientific literature of the day. His three most important books have received considerable acceptance in the educational field in the United States and in England. They are *The Mechanical Engineering of Power Plants, Heat and Heat Engines* and *The Gas Engine.* The first named is used as a text-book in some of the technical institutions of Japan. He prepared also two important monographs for the census of 1880, one on machine tools and the other on pumps and pumping machinery.

Besides these important contributions he has contributed to the Transactions of the Mechanical Engineers, both over his own name and with unsigned contributions, memorial monographs, contributions to discussion and the like. He has been asked to act as associate editor in such work as the revised edition of Johnson, and last of all in an effort to revise, simplify and bring up to date scientific and engineering titles in the Century Dictionary. This work is completed as far as the letter L, at this writing, but was held up last winter by the strike in the printing houses of the city. He has also been departmental editor in the *Engineering Magazine* and a contributor to technical journalism. He has lectured before scientific and popular audiences in New York and elsewhere at various times.

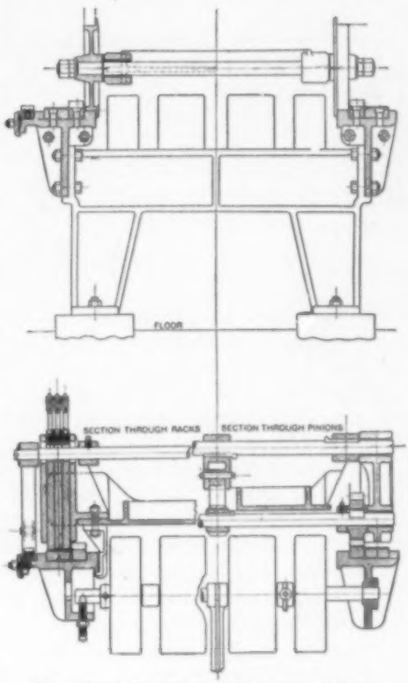
Cassier's Magazine Sold.—*Cassier's Magazine* has been sold by the estate of the late Louis Cassier to Henry Harrison Suplee, for many years the technical editor of the *Engineering Magazine,* and James Van Vorst Colwell, recently works manager for the D. W. Hunt Co., and the publication will be continued as heretofore by the Cassier Magazine Co. at No. 3 West Twenty-ninth street, New York. The editorial conduct of the magazine will be in the hands of Mr. Suplee, who brings to this work a wide experience both in the practice of mechanical engineering and of technical journalism, while the business department will be directed by Mr. Colwell. The first issue of the magazine under the new management will be the January number.

The Treadwell Co. is adding a small foundry to its plant at Lebanon, Pa.

THE SPACING TABLE IN STEEL FABRICATING PLANTS.

By Geo. P. Thomas.

The main problem in a steel fabricating plant is the handling of material this applies to nearly every operation in the shop. The number of holes that can be punched on a machine, or the number of rivets that can be driven in a day are directly dependent on the means and facilities provided for these operations. The actual time consumed for punching a hole, excepting where improved facilities are provided, is but a fraction of the time ordinarily required in getting the material into position. The conditions are similar in the case of riveting.



Section Through Spacing Table.

Handling of material for punching is a problem that is receiving a great deal of attention in every shop. That room for improvements exists in the average shop and that such improvements can usually be made at a trifling cost, considering possible results, is not questioned. Any improvements that permit the saving even a couple of seconds in punching a hole will make quite a showing at the end of the day. Taking a shop having an output of 40 tons per day as an example, this means on an average that 20,000 holes are to be punched. Averaging 400 holes per hour on a machine would require 50 hours, and working nine hours per day nearly six machines must be in service to do this work. By saving two seconds of the time required for punching a single hole, five machines would do the work easily. In figuring the above, the time required for handling material to and from machines, etc., is included.

The old way of handling material for punching, which is still in use in many of the smaller shops, is to suspend the material from overhead trolleys. A more modern way is to use roller tables and manipulate the material through the machine by means of a lever. This is a decided improvement over the trolley method and is the system generally adopted in modern plants. The next step forward introduces the spacing table which is the subject of this article. The saving effected by a practical machine of this kind is so large that this subject is one of interest everywhere.

The increased number of holes punched, large as it is, represents only a part of the saving, considering the cost of templet making, marking of material and resulting handling. The cost of marking alone may be said to average around 40 to 50 cents per 1,000 holes and templet making 30 to 50 cents per ton.

In many shops, the lack of room is the reason advanced against the introduction of spacing tables and roller tables, the machines being so located that operations on them overlap. This is an arrangement that could be avoided in the majority of cases, and is, in any event, bad. Having fewer machines, properly located and arranged so as to be operated efficiently, makes a remarkable difference in the shop cost.

It may be interesting to show what can be accomplished, by an actual comparison of the cost of punching holes with the various methods employed. The cost per 1,000 holes using the trolley system averages $1.50 to $2.00; with roller tables 80 cents to $1.20; with the spacing table 20 to 40 cents, actual cost of punching. These figures vary somewhat with the different shops but may be considered a fair average. Of course the enormous saving apparent from the use of a spacer is restricted to a certain class of work but a little training in the drafting room will produce very tangible results in widening the range. Installing a spacing table in a shop with orders to the foreman to use it wherever possible, will not suffice if first class results are expected. The drafting room must receive early attention. Like the machinery designer who considers the various operations through which each piece will go in the shop and guides himself accord-

ingly in his design, the structural designers can greatly facilitate operations in the punch shop especially by avoiding changes of gauge in angles and keeping holes confined to straight parallel lines on plates wherever possible. Usually this receives no attention, after the number of rivets required is ascertained the holes are located in any convenient place without regard to the shop or to symmetry.

A spacing table can reach all holes on parallel, line two inches apart and as close as ¾-inch centers; by making preparations holes less than ¾-inch centers can be reached but no practical system of gauges has yet been found that would reach holes placed between the two-inch parallel line. Holes in angles, having a change of gauge can be spaced, but this means a stoppage for every change and is not practical, more on account of the liability of errors than for any other reason. Trying to meet above conditions involves no additional expense in drafting room and seldom any disadvantage in the proper location of rivets.

Sometimes material has two different sizes of rivets. This occurs in the chords of pin connected bridges, and these can be spaced by punching all holes to the smaller size and reaming for the larger, or if preferred twin gags can be used on the punch.

In the shop, the old notions about spacing tables are rapidly disappearing, nearly every shop has tinkered more or less with them. Barring a few exceptions the home made machine has been a universal failure, proving wholly unreliable and inaccurate, and these results probably account for the prejudice of the average shop man against the introduction of reliable machines. In many cases the cause of failure can be directly traced to the attempt to build too cheaply. Among other objections was the great amount of time required for setting which limited its use to a large number of similar pieces, usually not less than thirty.

One by one such drawbacks have been renewed; perfectly reliable tables are now made that can be set for any desired spacing in a few minutes, thus making them available for as few as four or five pieces. To make them a real success all around, however, consideration must be given to the proper arrangement of the punch and it might not be amiss to mention a few of the little details that are sometimes lost in the shuffle

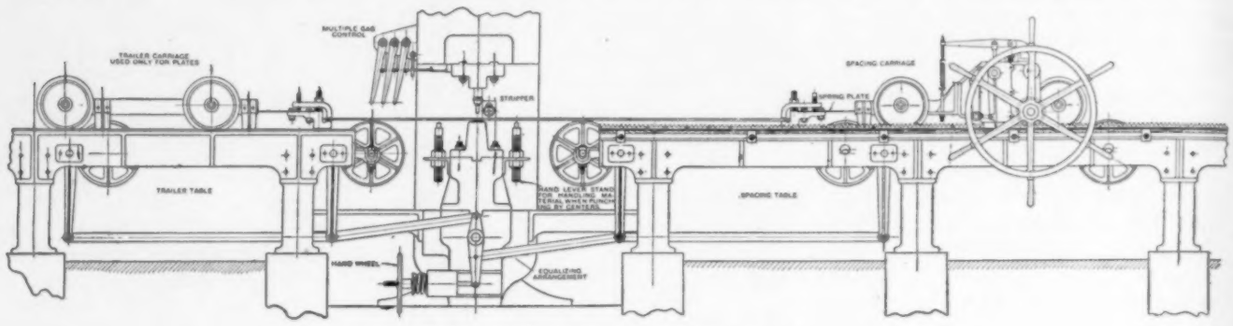
In the spacing table rigid construction is a necessity, and for this reason, a structural or riveted frame is not desirable. This concerns a machine in which plates are to be handled; for shapes alone, perfect alignment is not required.

Ordinarily the speed of the punch is not considered, yet to meet the ever varying conditions of the work, a variable speed is a necessity. On work where holes are located close together and with experienced operators the speed of the punch can be at least 30 to 34 strokes per minute. When the space is about six to 10 inches, 20 to 24 strokes are about right. A variable speed motor will give all the desired variations in speed.

Strippers in many shops are a constant source of trouble, and this trouble frequently becomes acute on multiple punches. All sorts of schemes are resorted to in the endeavor to remedy the evil and usually the trouble is not with the strippers at all. Improper alignment of punches and dies, causing the holes to be punched on a slight angle and the neglect of the operator to properly grease the punches, and consequent hard stripping is the cause of nearly all stripper troubles, chronic or otherwise. Not only that, but they are the chief causes of the breaking and wearing of punches. In the case where the punches and dies are not central, a heavy fin is produced on one side of the hole, causing the material to stick to the dies so that a bar sometimes is required to effect a release, besides causing trouble in assembling.

If this occurs when using a spacing table it means delay and unsatisfactory work and is usually ascribed to the shortcomings of the machine when the operator is entirely at fault.

Greasing of the punching is imperative, and usually this is done by means of a wad of waste fastened to the end of a piece of wire. Where a number of punches have to be greased quickly and often, a small round paint brush will be found more suitable; thick black oil or the dripping from beatings should be used. Many shops spend valuable time and money experimenting with various grades of steel for their punches and dies. A little attention to the arrangement of the strippers, alignment of punches and dies and proper lubricating will wonderfully increase life of punches.



GENERAL VIEW OF THE SPACING TABLE.

The arrangement of rollers on a spacer is important, as the material to be handled is seldom free from waves or crooks. A system that permits quick adjustment to height of dies without stopping operation is to be preferred. In the case of angles it is best to punch with the legs up, if possible, as by having storage skids of the same height as the rollers, suitably placed, they can be skidded on and off quickly and dispense with use of a crane. If punched with the leg down, the crane is indispensable, and ordinarily causes delay. For handling plates, good crane service must be had.

In conclusion it might be said that the chief cause of failure to get results from a spacing table is the lack of attention to details. Many concerns have these machines continually in service and holes have been punched for less than 15 cents per 1,000, truly remarkable results.

A machine to give these results is not necessarily expensive or complicated or hard to set, the cost of maintenance is not high, not enough to make any appreciable inroads on the saving effected, and never more than two men are required for its operation.

NEW CANADIAN TARIFF

Makes Many Small Changes.—New Intermediate Rate.

Toronto, Canada, Nov. 30.—The revised Canadian tariff was brought down at Ottawa Nov. 29 by Hon. W. S. Fielding, finance minister. It was of the character generally anticipated, making a great many small changes in detail, but affecting no general increase or decrease in duties. The most noticeable feature is the adoption of an intermediate rate between the maximum or general tariff and the British preferential rate. This is to be applied to imports from countries giving Canada the benefit of lower duties, and will not at present be in operation. The British preference is retained and extended so as to apply to all parts of the empire. The dumping clauses are also continued and made applicable to goods on the free list as well as dutiable commodities. The iron and steel bounties are continued for four years on the sliding scale principle, as follows:

Pig iron, per ton, on proportion made from Canadian ore, 1907 and 1908, $2.10; 1909 $1.70; 1910, $0.90.

Pig iron, per ton, on proportion made from foreign ore, 1907 and 1908, $1.10; 1909, $0.70; 1910, $0.40.

Puddled iron bars made from Canadian pig iron, per ton, 1907 and 1908, $1.65; 1909, $1.05; 1910, $0.60.

Rolled round wire rods not over ⅜ inch in diameter, made from Canadian steel of which not less than 50 per cent consists of Canadian-made pig iron, when sold for making wire in Canada, $6 per ton.

Steel ingots, not less than 50 per cent of Canadian pig iron, per ton, 1907 and 1908, $1.65; 1909, $1.05; 1910, $0.60—this bounty not to be paid on ingots from which steel blooms and billets are made for export.

The following are a few of the leading items in the tariff dealing with iron and steel manufacturers. The figures first given are the rates under the general tariff; the others are the British preferential rates.

Iron in pigs, kentledge and cast scrap, per ton, $2.50, $1.50.

Iron or steel scrap, wrought, per ton, $1.00, $0.70.

Rolled iron or steel angles, tees, beams, channels, girders and other rolled shapes or sections, not punched, drilled or further manufactured than rolled, per ton, $7.00, $4.25.

Rolled iron or steel beams, channels and angle bars, etc., imported for use in the manufacture of bridges, 10 per cent; 5 per cent.

Rolled iron or steel sheets, or plates, No. 14 gauge and thinner Canada plates, Russian iron, flat galvanized iron or steel sheets, tern plate, and rolled sheets of iron or steel coated with zinc or other material, 5 per cent; free.

Iron and steel rails for railways, street railways, and tramways, public or private, per ton, $7.00, $4.50.

Iron and steel rails which having been in use have been exported from Canada and returned thereto, having been re-rolled abroad, 25 per cent; 25 per cent, value being fixed at cost of re-rolling same.

Railway fish plates and tie plates, per ton, $8.00, $5.00.

Switches, frogs, crossings and intersections for railways, 32½ per cent; 20 per cent.

Iron or steel bridges or parts thereof, iron or steel structural work, columns, shapes or sections, drilled, punched or in any other stage of manufacture than rolled or cast, 35 per cent; 22½ per cent.

Cast iron pipe of every description, per ton, $8.00, $6.00.

Wire, crucible cast steel, value not less than 6c per pound, 5 per cent; free.

Galvanized iron or steel wire, Nos. 9, 12 and 13 gauge, 5 per cent; free.

Buckthorn ship fencing, woven wire fencing, and wire fencing of iron or steel (not including woven wire or netting from wire smaller than No. 14 gauge, nor fencing of wire larger than No. 9), 15 per cent; 10 per cent.

Wire covered with cotton, rubber, etc., 30 per cent; 20 per cent.

Wire cloth, or wove wire and wire netting, 30 per cent; 20 per cent.

Mowing machines, harvesters, self-binders, or without binders, binder attachments, reapers, 17½ per cent; 12½ per cent.

Cultivators, plows, harrows, horse rakes, seed drills, manure spreaders, weeders and wind mills, 20 per cent; 12½ per cent.

Threshing machine outfit, when consisting of traction or portable engine and separator, 20 per cent; 15 per cent.

Hay-loaders, potato diggers, horse-powers, separators, wind stackers, feed cutters, grain crushers, fanning mills, hay bedders, farm or road rollers, etc., 25 per cent; 15 per cent.

Telephone and telegraph instruments, electric batteries, electric motors, dynamos and generators, 27½ per cent; 20 per cent.

Locomotives and motor cars for railways and tramways, 35 per cent; 22½ per cent.

No duty has been placed on tinplate.

The Dayton Pneumatic Tool Co., Dayton, is distributing a souvenir pencil in a neat case calling attention to the Dayton pneumatic hammer.

RIGHT TO STRIKE SUSTAINED.

Milwaukee, Wis., Dec. 3.—State Judge James J. Dick of Beaver Dam, Wis., sitting in Milwaukee, has handed down a decision that men may organize and form unions, that such unions as a body may strike without the action being a conspiracy, and that strikers may use persuasion in an endeavor to prevent others taking their places of employment.

The decision is in the proceedings of the Vilter Mfg. Co. of Milwaukee, against the Iron Molders' union for alleged contempt of one of its members, A. C. Humphrey, who was alleged to have violated an injunction issued by a court commissioner restraining the molders and Mr. Humphrey interfering with non-union men. Mr. Humphrey had been cited to show cause why he should not be held for contempt because of his activity as a picket.

The decision is much the same as that handed down recently by Federal Judge J. V. Quarles.

John R. O'Leary, a national official of the Molders' union, is being sought by federal circuit court officials as a defendant in contempt proceedings being conducted against striking molders of the Allis-Chalmers Co.

About 1,000 persons met at Harmonie hall the Tuesday preceding Thanksgiving and listened to addresses by Frank J. Weber, business agent of the Federated Trades Council, the Rev. H. H. Jacobs, warden of the University settlement in Milwaukee, and others, encouraging the striking molders. In the audience were many of the wives and children of the molders, and each man out of work was given $2 as an extra Thanksgiving allowance. The men have issued a formal letter in reply to the one recently issued by the manufacturers of Milwaukee. They express their determination to continue the strike.

At the annual meeting of the stockholders of the West End Rolling Mill Co., Lebanon, Pa., held Nov. 21, the following directors were re-elected: Christian Shenk, J. Henry Miller, Dean J. Capp, J. R. Evans, H. P. Moyer, George R. Ross, of Lebanon, and Leroy J. Wolfe, of Harrisburg. The board re-elected the following officers: Christian Shenk, president; John R. Evans, secretary, and Major P. Moyer, treasurer. William P. Boger is superintendent of the plant.

F. O. Curtis, president and general manager of the Curtis & Neff Screw Co., Ltd., Buffalo, has purchased all the stock of that company and will continue the business under the old name for the present.

BOOK REVIEWS.

The Mineral Industry for 1905: Edited by Walter Renton Ingalls, editor the *Engineering and Mining Journal*, New York and London. The *Engineering and Mining Journal*; 6½ by 9½ in.; 739 pages; cloth; supplied by THE IRON TRADE REVIEW for $5.00.

This is the fourteenth annual volume of the "Mineral Industry" and contains over 700 pages of statistics and facts relating to the subjects treated. The title chosen for this series by Mr. Richard P. Rothwell, the founder, is a very happy one, as it is broad enough to enable a treatment not only of the statistics concerning minerals to be included, but also a treatment of the recent advances which have been made in the different lines of metallurgy. No library that professes to keep up with the lines including the use of metals should be without this book, and it is one of the books most active engineers, and especially those directly engaged in mining or manufacturing using minerals as a base, should place on the library shelf each year. It is only by reading some such work as this that one can keep abreast of the times. Of course, much of the material can be gained by reading technical papers, but the "Mineral Industry" condenses all of the advances made during any given year into one volume, and thus renders it available in more condensed form for the busy engineer.

As its name implies, it is not confined to the metals, or to any one class of minerals, but to those interested in metallurgy of iron and steel, it will be found of value along their particular lines. It also contains much along the allied lines. For instance, under the subject of "Aluminum" there are many facts stated covering new uses and points of interest concerning its metallurgy. The volume each year contains a sufficient statement of the production and use of the different metals so that each volume is independent of its predecessor in these respects, but frequently extensive metallurgical processes which have been described in one volume are referred to in later volumes.

In the present volume under the heading "Antimony" there is a short section on bearing metals. Under the heading "Bauxite" there is considerable material concerning the use of this material for refractory purposes. This is especially interesting, as bauxite bricks are just coming into use for certain classes of work.

The section on copper contains a very large amount of material which will be of interest to any one using copper or copper alloy. In this connection it might be stated that frequently by following up metallurgical processes used in other departments of metallurgy, the engineer or manager is able to make new applications which greatly facilitate the output of existing apparatus.

There is also considerable matter of interest concerning oil burners and the use of oil for fuel in metallurgical operations. The iron and steel statistics are necessarily more curtailed than those in some of the books devoted exclusively to this purpose, but will be found exceedingly interesting nevertheless.

With the rapid development of the high-speed tool steel, a number of rare metals have come to the front and are playing an important part in the metallurgy of the present time. Each of these receives appropriate treatment in the volume under consideration. The chemist and assayer will also find food for thought and valuable suggestions in the work. For instance, in the section on "Zinc" the analytical methods for use in connection with determinations are given. There are also notes and suggestions on sampling and assaying, these sections having been written by H. O. Hofman. In this connection it will undoubtedly be of interest to state that there were fifty-one authors or special writers engaged in the preparation of the different sections of this latest volume.

Modern Iron Foundry Practice, by George O. Bale. Manchester, England. Technical Publishing Co., Ltd. Published in two parts, each 5 x 7¼ inches. Part I, 375 pages, treats of foundry equipment, materials used, and processes followed. Part II, 190 pages, treats of machine molding and molding machines; also of physical tests of cast iron, methods of cleaning castings, and foundry accounting. Supplied by THE IRON TRADE REVIEW. Part I, for $1.25; Part II, for $1.00, postage and duty extra.

Both volumes are printed in very closely set type so that they contain a very large amount of matter, and both are illustrated with a large number of cuts. Some of the pages treat of the following subjects: Molding sands, the cupola and its charge, vibratory furnaces, ladles, cranes and hoists, green sand molding, core ovens, dry sand molding, loam molding, chill castings, malleable castings. The work is well written, clear and concise, and the book contains many tables and diagrams of interest to foundrymen. The practices are in many respects distinctively British, but the work will be found useful to foundrymen in all countries, and the work should take its place with the recognized books upon these subjects.

The second part deals, as already mentioned, with molding and molding machines, the cleaning of castings, shrinkage and distortionate castings, physical tests of cast iron, foundry accounts, and testing machines are also illustrated. There are many types of molding machines described and illustrated, including both American and British patterns. Under the head of cleaning of castings the various devices are described, and particularly the sand blasts. The chapter on physical tests of cast iron is of interest, though the machines described and illustrated and the tests carried on are largely British and many of them do not apply to American practice. They, however, cast much light upon the nature of cast iron, its composition, etc.

The American Steel Worker, second edition, by E. R. Markham. New York. The Derry-Collard Co. 5¼ x 8 inches. 339 pages. Cloth. Supplied by THE IRON TRADE REVIEW for $2.50.

This is the second edition of this well-known work. It has been carefully revised and brought up-to-date in many ways. One of the most striking points to those who are familiar with both editions is that the publishers have adopted a better grade of paper for the new edition. Those who are familiar with the old work will need no introduction to it. It is the result of the practical experience of a man who has worked for 25 years with the smith shop as his sphere of action. The practical hints contained in the work are worth many times the price of the book to anyone who is connected with operations of this class. The different processes are illustrated by remarkably well-made and clear illustrations, or diagrams, and the language used is easy and plain. In this new edition of the work the additions which have been made in the use of high speed tool steel are treated, together with many other points of special interest to those who have to work steel of various kinds. This book should be in the hands of not only every steel worker whether he be blacksmith or toolmaker, but should also be in the hands of every works manager who has a blacksmithing and tool-making department connected with his establishment.

"Wiring a House," by Herbert Pratt. New York. Derry-Collard Co. 6 x 9 inches. 21 pages. Illustrated. Paper. Supplied by THE IRON TRADE REVIEW for 25 cents.

This is on a series of practical papers, devoted to various industrial subjects. It gives directions for the electric wiring system of a house and is most elementary in character.

Week of Quiet on the Stock Exchanges.

The week on the stock exchanges was extremely quiet with speculation almost at a standstill as the result of the Thanksgiving interruption, of the feeling of hesitancy always preceding the appearance of the president's message and the assembling of congress and of other less important factors. The money situation continued to exert a powerful influence. The Bank of England succeeded in increasing its proportion of reserve and liabilities to a very satisfactory extent, although it will lose heavily by reason of the holiday demands. In this country there has been a heavy flow of money from New York to the interior and the sub-treasuries, with the result that the New York banks lost about $2,800,000 in cash, while loans increased more than $5,000,000. Call money rates reached 27 per cent on the closing day of November and a further advance was checked only by drastic action. Time loans ranged from 6 to 7 per cent. With only light trading, several industrial securities recorded important gains. Virginia Iron, Coal & Coke, which of late has shown remarkable strength, apparently because of its excellent operation, netted a handsome increase, and Railway Steel Spring and Bethlehem Steel common also made gains. The industrial situation continues unchanged and, aside from the money difficulties, apparently contains no element of weakness. Incorporations of new concerns are still of immense volume, the *Journal of Commerce* estimating the aggregate capital of corporations formed during November at $378,990,000, of which $227,950,000 was in eastern states, which during November, 1905, reported only about $50,000,000 incorporations.

Financial Notes:—

Directors of the Niles-Bement-Pond Co. have declared a cash dividend of 40 per cent on the common stock, payable Jan. 2, and have voted to issue $3,500,000 of common stock recently authorized to present holders. Subscriptions on this will close Dec. 10. Directors of the Railway Steel Spring Co. have declared the regular quarterly dividend of 1¾ per cent on the preferred stock, payable Dec. 20. The National Enameling & Stamping Co. has declared the regular quarterly dividend of 1¾ per cent on the preferred stock, payable Jan. 1. Directors of the American Shipbuilding Co. have declared the regular quarterly dividend of 1 per cent on the common stock, payable Dec. 1. Directors of the Ashland Coal & Iron Co. have declared the regular quarterly dividend of 1 per cent on the common stock, payable Dec. 20.

The re-organization plan of the National Steel and Wire Co. gives a $1,000 bond and four shares of preferred for present preferred for both the main and subsidiary concerns. Ten shares of common receive one in preferred and ten in common. Stockholders may subscribe for $1,000,000 bonds at 95 with a bonus of two shares of common with a $1,000 bond.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Nov. 24.	Closing Quotation Dec. 1.	Changes	Date of 1906 Ann. Meet.	Par Value	Capital Outstanding	Dividend Basis	Dividend Being Paid	Date Last Div. Pay.
Allis-Chalmers Co	17⅛	17⅛	.....	Sept.	100	19,820,000		.....	.....
Allis-Chalmers preferred	45½	45¾	+ ⅛		100	16,150,000	7 cum	.....	Feb., 1904
American Can	6⅝	6	− ⅝	Apr. 24	100	41,233,300		.....	.....
American Can preferred	55¾	55	− ¾		100	41,233,300	7 cum	5 Q.	Oct., 1906
American Car and Foundry	43¾	45⅛	+1⅛	June 28	100	30,000,000		.....	May, 1905
AmericanCar and Foundry preferred	101¼	101¾	.....		100	30,000,000	7 n. c.	7 Q.	Oct., 1906
American Locomotive	74⅛	76	+1⅜	Oct. 16	100	25,000,000		1¾	Nov., 1906
American Locomotive preferred	111¾	111¾	.....		100	24,100,000	7 cum	7 Q.	Oct., 1906
American Shipbuilding	77⅛	77⅛	.....	Oct. 2	100	7,600,000	4 n. c.	1 Q.	Dec. 1906
American Shipbuilding preferred	110	108	−2		100	7,900,000	7 n. c.	1¾ Q.	Nov. 1906
American Steel Foundries	10⅝	10⅛	− ⅛	Oct. 3	100	17,700,000		.....	.....
American Steel Foundries preferred	46½	46½	.....		100	17,700,000	6 cum	.....	Aug., 1905
Barney & Smith	72	72	.....	June 5	100	1,000,000	4	4	Dec., 1906
Barney & Smith preferred	140	140	.....		100	2,500,000	8 cum	8 Q.	Dec., 1906
Bethlehem Steel	19	20	+1	April 3	100	15,000,000		.....	.....
Bethlehem Steel preferred	67¼	64	−3¼		100	15,000,000	7 n. c.	3 Q.	Nov., 1906
Bullock Electric preferred	112	112	.....	Oct. 2	100	1,000,000	6	6 Q.	Oct., 1906
Cambria Steel	37⅜	38⅜	+1⅛	March 20	50	45,000,000	6	3 Q.	Aug., 1906
Cambria Iron	48	48	.....		50	8,468,000	4	4 S. A.	Oct., 1906
Colorado Fuel & Iron	54½	55	+ ⅜	Oct. 15	100	30,132,000	7	.....	Apr., 1902
Wm. Cramp & Sons Ship & Eng. Bldg. Co.	15	.....	.....	May 31	100	6,098,000	5	.....	Nov., 1902
Crucible Steel	13	12½	− ½	Oct. 17	100	25,000,000		.....	.....
Crucible Steel preferred	80¾	80¾	.....		100	25,000,000	7 cum	.....	Sept., 1906
Empire Steel	5	5	.....	Feb. 28	100	2,281,400		.....	.....
Empire Steel preferred	42	42	.....		100	2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	95	95	.....	Feb. 20	100	1,000,000	6	6 Q.	Nov., 1906
Fay & Egan preferred	128½	128½	.....		100	1,000,000	7 cum	7 Q.	Nov., 1906
General Electric	176½	177¾	+1¼	May 8	100	48,256,050	8	8 Q.	Oct., 1906
International Pump	42⅛	40½	−2	June 5	100	12,262,500		2	July, 1905
International Pump preferred	82	81	−1		100	8,850,000	6 cum	6 Q.	Nov., 1906
Lackawanna Steel	71	71	.....	March 14	100	34,971,400		.....	.....
Lake Superior Corporation	15	14¾	− ¼	Oct. 3	100	40,000,000		.....	.....
Niles-Bement-Pond	130	130	.....	Feb. 7	100	5,000,000	6	6 Q.	Sept, 1906
Niles-Bement-Pond preferred	105	105	.....		100	2,000,000	6 cum	6 Q.	Dec., 1906
Otis Elevator Co	50	50	.....	March 19	100	6,350,300		2 A.	Apr., 1906
Otis Elevator Co. preferred	97	96	−1		100	5,589,500	6 n. c.	6 Q.	Oct., 1906
Pittsburg Coal Co	17	16⅝	− ⅜	Feb. 12	100	30,135,000		.....	.....
Pittsburg Coal preferred	59⅛	58½	− ⅝		100	30,716,200	7	.....	Apr., 1905
Pressed Steel Car	54	55⅜	+1⅜	Feb. 21	100	12,500,000		3	Aug., 1904
Pressed Steel Car preferred	97½	99½	+1¾		100	12,500,000	7 n. c.	7 Q.	Nov., 1906
Pullman Palace Car		189	.....	Oct. 18	100	74,000,000		8 Q.	Oct., 1906
Railway Steel Spring	53	57	+4	March 1	100	13,500,000		4 S. A.	Oct., 1905
Railway Steel Spring preferred	100	100½	+ ½		100	13,500,000	7 cum	7 Q.	Dec. 1903
Republic Iron & Steel	37¼	38	+ ½	Oct. 17	100	27,352,000		.....	.....
Republic Iron & Steel preferred	100⅜	101	+ ⅝		100	20,852,000	7 cum	7 Q.	Jan., 1907
Sloss-Sheffield	75⅛	76	+ ⅛	March 14	100	7,500,000	5	5	Oct., 1906
Sloss-Sheffield preferred	105	104	−1		100	6,700,000	7 n. c.	7 Q.	Oct., 1906
Tennessee Coal & Iron	160	163½	+3½	May 15	100	22,552,800		4 Q.	Nov., 1906
U. S. Cast Iron Pipe & Foundry	47	46	−1	June 27	100	12,500,000		2	Dec., 1906
U. S. Cast Iron Pipe & Foundry preferred	83¾	80⅝	−2⅛		100	12,500,000	7 n. c.	7	Dec., 1906
U. S. Steel	47⅝	48	+ ⅜	April 16	100	508,302,500	2 n. c.	½ Q.	Oct., 1906
U. S. Steel preferred	105	106	.....		100	360,281,100	7 cum	7 Q.	Nov., 1906
U. S. Steel 5's	98	97	−1		100	463,798,000	5	5 A.	.....
Virginia Iron, Coal & Coke	74⅛	80⅜	+6¼	Sept. 18	100	8,641,600		.....	.....
Westinghouse Electric	155	150⅜	−4⅛	June 27	50	20,996,350	10	10 Q.	Oct., 1906
Westinghouse Air Brake	161	162⅞	+1⅞	Oct. 2	50	10,990,450	20	20 Q.	Oct., 1906

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The Detroit Spring Wheel Co., Detroit, has been incorporated to manufacture a new automobile wheel in addition to automobiles, automobile supplies, etc. The capital stock of the company is $100,000, and the incorporators are: Walter Parker, William T. McGraw, Frank G. Smith Jr., Harry Bennett and Benjamin S. Warren. A new factory will probably be built.

The American Die & Tool Co., Reading, Pa., has been organized by H. M. Sternbergh, J. H. Sternbergh, Edwin S. Smith and C. S. Dundore.

The Licking Rolling Mill, the Droege & Sons' Coal Co. and the Droege & Sons' Foundry Co., all of Covington, Ky., have been re-organized and will hereafter be known as the I. Droege & Sons' Iron Foundry & Coal Co. The capital stock of the company is $1,000,000.

A Pennsylvania charter will shortly be asked by the Erie Tool Co., composed of M. W. Bacon, Frank Bacon, G. H. Clows and others of Erie, Pa.

The Consolidated Hardware Mfg. Co., Ltd., Hamilton, Ont., has been incorporated to manufacture tacks, nails and machinery. The capital stock is $40,000, and the provisional directors are: Thomas H. Wynn, Frank Forsyth and Charles A. Brigger.

Application has been made for a charter for the Snyder Electric Co., of Pittsburg, by C. L. Kerr, J. W. Hanly and Elliott Frederick.

The William C. Pfeiffer Boiler Works, Chicago, has been incorporated with a capital of $5,000 by James Hibban, David M. Ball and W. A. Sheridan.

The Roanoke Foundry & Machine Co., Roanoke, Va., has been incorporated to operate a foundry and machine shop. The capital stock is $30,000, and the incorporators are: A. J. Kennard, J. E. Reichhardt, J. W. Winston, H. E. Obenschain, A. D. Pettyjohn, J. L. Richey and others.

The Borntrager Gas Engine Co., Pittsburg, has been organized by Carl H. Borntrager, H. C. Sherrard and others.

The Central Foundry Co., Cincinnati, has been organized with a capitalization of $25,000 by John T. Gardner, W. L. Huber, C. E. Morgedant, A. W. Morgedant and W. C. Morgedant.

The Millansin Engineering & Foundry Co., Sharon, Pa., has been incorporated and will manufacture brass castings, drop forgings, ordnance and tools. Work on the new plant has already been begun.

The Crawfordsville Tank Co., Crawfordsville, Ind., has been incorporated with a capital stock of $20,000 by M. B. Binford and C. O. McFarland.

The Equipoise Rivet Co., Waterbury, Conn., has been incorporated to take up the business of Hotchkiss Bros., of Wallingford, and will manufacture large and small iron rivets. The capital stock of the company is $3,000, and the incorporators are: G. G. Riggs and A. E. Babin.

The W. H. Nicholson Co., Wilkes Barre, Pa., has been organized to engage in the iron and steel business. The incorporators are: W. H. William, S. T. Nicholson and George Nicholson.

The Gould Balance Valve Co., Des Moines, Ia., has increased its capital stock to $300,000.

The Interstate Iron & Metal Co., St. Louis, has been incorporated to deal in iron, metals, etc. The capital stock is $75,000, and the incorporators are: Joseph Mathes, Frederick Meyer, Zachariah Lippe and Henry Meyer.

The Crown Machine Works, Terre Haute, Ind., has been incorporated with a capitalization of $25,000 by A. L. Pfau, N. W. Kirkpatrick and M. Henry.

The Standard Wheel Works, located at Thirteenth and Plum streets, Terre Haute, Ind., has been incorporated with a capital of $1,000,000 and will manufacture vehicle wheels and all kinds of wheel material. The incorporators are: Jay H. Keys, W. C. Clark and L. W. Greenleaf.

The Corbett-Taylor Co., principal office 143 North Warren street, Trenton, N. J., has been incorporated and will manufacture and deal in shaftings, hangers, couplings, pulleys and other devices. The capital stock is $100,000, and the incorporators are: Leslie C. Pierson, Ellsworth A. Corbett and James Taylor.

The Home Gas Machine Mfg. Co., principal places of business at Oklahoma City and Chicago, has been organized with a capitalization of $50,000 by F. M. Campbell, L. C. Wood, Albert Young, Joseph Scholl, of Chicago; W. F. Harn and A. Harn, of Oklahoma City.

D. C. Stover & Co., Freeport, Ill., have been incorporated with a capital of $50,000 by D. C. Stover, J. P. Stover, Fred R. E. Dawson, J. F. Smith, W. A. Hance, Paul F. Schryer and P. S. Stover.

The Lowe Block Machine Co., Bristol, Tenn., has been organized with a capitalization of $30,000 by N. D. Bachman, L. T. Lowe, W. G. Bachman, H. F. Henderson and E. K. Bachman.

The Hutchins Iron & Ore Co., Portsmouth, O., has been incorporated with a capital stock of $5,000 by Levi D. York, Dudley B. Hutchins, Raymond D. York, Wells A. Hutchins and Harry D. Miller.

The Bessemer Steel Casting Co., Bessemer, Ala., has been organized with a capitalization of $150,000 and will manufacture basic open-hearth steel castings by the Hawkins-Key process. The capacity of the plant will be 75 to 100 tons a day, and it will at first employ about one hundred men, the force to be increased as the business grows. The site for the plant has already been secured.

The Myers Pump & Mfg. Co., Bliss, Okla., has been incorporated with a capital of $50,000 by W. M. Myers, St. Joseph, Mo.; G. L. Miller and L. Marks, Bliss.

The Unique Engineering Co., chartered with a capital stock of $25,000, will manufacture smoke consumers and draft generators. The incorporators are: George R. Rothenbuck, No. 183 Alabama avenue; Richard Buchhiltz, No. 533 Lorimer street, and William Rappersberg, No. 201 Pennsylvania avenue, all of Brooklyn.

The Ross Steam Specialty Co., mechanical and electrical engineer, has been incorporated with a capital stock of $30,000. The incorporators are Horace N. Dougherty, No. 841 Park Place; Henry T. Gerdes, No. 5 Van Nest Place, both of Brooklyn; and Adolph H. Stein, No. 216 Harrison street, New York.

The Racine Gas Engine Co., Racine, Wis., has been organized with a capitalization of $25,000 by Edward Hoernel, Andrew Rasmussen and Charles Rasmussen.

The Standard Thermostat Equipment Co., Boston, Mass., has been incorporated with a capital stock of $100,000. The officers are: President, Jarvis E. Baker, No. 522 Massachusetts avenue, Boston; treasurer, George M. Foster, No. 107 Main street, Peabody, Mass.; clerk, William E. Ludden, No. 294 Washington street, Boston, Mass.

The Wegner Electric Hammer Co., incorporated with a capital stock of $45,000, will manufacture electric hammers, drills, etc. The incorporators are: Oscar A. Campbell, No. 206 Marcy avenue, Brooklyn; Hillary C. Messimer, No. 55 East 6th street, and Thomas J. Williams, No. 123 West 11th street, both of New York.

The M. C. Clamp Co., New York, has been incorporated with a capital of $25,000 to manufacture clamps, tools, etc. The incorporators are: Le Roy Clark, 56 West Seventy-first street, New York; Alfred H. Meech, Chatham, N. Y., and Henry Scofut White, 95 Mercer street, Plainfield, N. J.

The United States Horse Shoeing Co.,

Hamilton and Neilson streets, New Brunswick, N. J., has been incorporated to manufacture horse shoes, etc. The capital stock is $2,000,000, and the incorporators are: Frank R. Jones and George F. McCormick, New Brunswick, N. J., and Edward Morris, Metuchen, N. J.

The Ross Mechanical Firing Co. has been organized to manufacture stokers, boilers and engines. The capital stock is $100,000, and the incorporators are: George G. Allen, No. 527 Fifth avenue; Walter B. Horn, No. 23 Wall street; and William A. Ross, No. 1 Madison avenue, all of New York.

The Bruckner Engineering & Importing Co. has been incorporated with a capital stock of $25,000 to manufacture electrical instruments and machines. The incorporators are: Frederick C. Bruckner, No. 1023 Jennings street, Paul S. Duhrenheimer, No. 1054 East 169th street; and William W. Hotchkiss, No. 1404 Prospect avenue, all of New York.

The Marvel Acetylene Generator Co., Ltd., Bradford, Ont., has been incorporated with a capital of $10,000; provisional directors, Albert J. Moore, Frederick W. Moore, Albert E. Scanlon, Charles W. Ellis, Peter Holt, H. S. Broughton and John Elliott.

Butterworth & Co., Ltd., Ottawa, Ont., founders, fitters, etc., have been organized with a capital of $100,000; provisional directors, Enoch B. Butterworth, Charles A. Butterworth and Alfred F. Butterworth.

The Boston Brass & Iron Co., Boston, has been incorporated with a capital stock of $25,000. The officers are: President, Solon Pingham, Newton Highlands, Mass.; treasurer, Charles A. Pearce, Newton Center, Mass.; clerk, Michael H. Sullivan, 48 Hewins street, Boston.

The Howard Machine Co., Inc., Boston, automatic machines, has been incorporated with a capital stock of $10,000. The officers are: President, Joseph W. Howard; treasurer, Robert G. Howard; clerk, J. Dwight Howard, all of Newton, Mass.

New Construction:—

The Ellsworth Foundry & Machine Works, Ellsworth, Me., recently incorporated, is erecting a storage warehouse and shed for the storage of patterns, etc., and will enlarge its previous business of manufacturing gasoline engines, stave machines, mill machinery and foundry work. It will also increase its capacity to take care of jobbing and repair work.

The Republic Metalware Co., Chicago, Ill., will erect an eight-story warehouse on Wabash avenue 170 x 63 feet, of mill construction, to cost $150,000.

The Nova Scotia Steel & Coal Co., Sydney, N. S., will add another blast furnace to its plant at that place early in the coming spring, thus enlarging its output to about 400 tons of pig iron a day. On account of the extensive repairs now being made to the furnace, which will not be completed before the latter part of December, the company is not smelting any ore at present.

The Illinois Traction Co. has broken ground for a car factory at Tilton, Ill.

The large addition to the plant of the American Ship Building Co. at Lorain, O., is now ready for operation. Some 300 more men will be given employment.

Pear & Isecovitz, scrap dealers of Reading, Pa., are enlarging their plant. Contract for the work has been placed with the Brown Engineering Co., of that city.

Estimates on the erection of a foundry building at Riverside, N. J., are being taken by the William Steel & Sons Co., of Philadelphia. The building will be of brick, two stories high, with floors of reinforced concrete. It will cover an area of 159 x 75 feet.

The Forged Wheel Co., New Castle, Pa., has an addition to its office nearly completed.

The Bessemer Salvage & Mfg. Co., Bessemer, Ala., has enlarged its plant by the addition of a machine shop with a view to handling iron work of all kinds.

The Sheffield Pipe & Casting Co., making heavy iron castings, has begun work on the construction of a large plant at Sheffield, Ala.

The Chickasaw Iron Works, Memphis, Tenn., has purchased a tract of five acres of land adjoining the property of the Interstate Cooperage Co., in North Memphis, upon which it will erect a branch plant. Three iron buildings 150 x 75 feet will be erected, consisting of a foundry and structural shops in which pattern work and steel molding will be done. A power house will also be erected.

The Detroit, Toledo & Ironton railroad shops, now located at Tecumseh, Mich., will be removed to Napoleon, O., within the next 30 days. To secure the shops Napoleon will furnish $5,000 and a small tract of land, the money to be paid after the shops are moved.

The W. H. Howell Co. has installed a new 18-ton cupola from the S. Obermayer Co. at its foundry at Geneva, O. The extensive additions recently made to its plant will necessitate increasing its force of workmen from 30 to 40 men. The company manufactures flat irons and the new improvements will practically double its present output.

The Central Steel Casting Co., Columbus, O., soon to be incorporated to manufacture steel castings for the general trade, has a number of sites under option and work on the new plant will be begun within a short time. The plant will have a capacity of 500 tons of steel castings a month. J. V. L. Bonney is promoting the company.

George Wainwright, of Wilson, N. C., will rebuild that portion of his foundry which was recently destroyed by fire.

The Newport Car & Locomotive Works, Norfolk, Va., recently incorporated, will erect a building 50 x 100 feet and will operate repair shops for cars and locomotives. The officers of the company are: W. G. Nottingham, president; J. E. Bowen, vice president, and J. S. Barron, secretary and treasurer.

The Patric Furnace Co., Springfield, O., will erect a large foundry 65 x 125 feet of brick and steel construction.

The contract has been let to Pike & Cook, of Minneapolis, for the construction of a new boiler shop 119 x 202 feet to be erected by the Minneapolis, St. Paul & Ste. Marie Railway Co., at its plant at Shoreham. The company is not in the market at present for equipment.

The Custer Coupling Works, at East Bradford, Pa., proposes to erect a brick building 170 x 60 feet in which modern machinery will be used. It is the intention of the company to enlarge the plant in order to double its present capacity. About 40 men are now employed at the plant.

The W. E. Hill Foundry Co. has purchased a tract of land in Kalamazoo, Mich., upon which it will erect a number of buildings within the next year. Three of the buildings will be equipped and the machinery put in operation soon after Jan. 1. The company is making arrangements to abandon the foundry established almost half a century ago.

The Wheeling & Lake Erie railroad has let the contract for the erection of a round house, sand house, coal tipples, machine and boiler shops at Brewster, O., on which work will be begun at once. The company expects to have the buildings erected by the middle of next summer.

Work on the new addition to the machine shop of the Abing Mfg. Co., of Huntsville, Ala., has been begun. The cost will be about $15,000.

George W. Miller, of Reading, Pa., will build an addition to his foundry on Penn street. The main building will be 35 x 40 feet, two stories high, of brick, with an addition 29 x 70 feet.

The new works of the Northern Malleable Iron Co., located on the southwest corner of Forest and Wells streets, St. Paul, Minn., will be ready for occupancy by Jan. 1. The main building will be 110 x 900 feet, of concrete and steel construction, the pattern shop and

fireproof pattern vault, each of concrete, will be 60 x 80 feet and 20 feet high. An office building and sand sheds are also being erected. A unique feature of the new building will be the reinforced concrete smokestack, which will be 130 feet high, 8 feet in diameter and 6 inches thick. The company at present employs 325 men, but after the new plant is completed it will increase its force to about 500. The total cost of the buildings will be approximately $150,000.

General Industrial Notes:—

At the annual meeting of the stockholders of the Tuscaloosa Coal, Iron & Land Co., Tuscaloosa, Ala., the following directors were elected: W. H. Boffinger, W. H. Boffinger Jr., J. C. Andrews, N. Bowling, L. C. Ivy, of New Orleans; F. W. Monnish, F. S. Moody, J. M. Foster and George A. Searcy, of Tuscaloosa. The board elected the following officers: F. W. Monnish, president; W. H. Boffinger, vice president; Henry B. Foster, secretary, and George A. Searcy, treasurer.

The Reliable Machine Co., manufacturing gas and gasoline engines, will locate in the Ellison building on West Ninth street, Anderson, Ind.

Caldwell Bros Co., of Tacoma and Seattle, Wash., will open a branch office in Spokane for the purpose of handling mining machinery.

Through the efforts of its "development company," Benton Harbor, Mich., has secured a location at that place for a large malleable iron foundry to be headed by G. S. Brutis, of Chicago. A bonus of $10,000 has been granted.

Thomas H. Kelley, of Cincinnati, has been appointed receiver for the charcoal furnace and the coal and iron properties of the Round Mountain Coal & Iron Co., Round Mountain, Ala. The appointment was made on the petition of Philip Strautman, of Cincinnati, a stockholder. The furnace has been out of blast for some time.

New Syracuse Foundry.—The Globe Malleable Iron Co., Syracuse, N. Y., which was organized in July last, is now producing about 10 tons daily of strictly high grade malleable iron castings. Officers of the company are as follows: W. C. Lipe, president; A. T. Brown, vice president; S. J. Marshall, treasurer, and J. S. Pickell, secretary. Mr. Lipe, the president, is also vice president of the Brown-Lipe Gear Co. and the H. H. Franklin Mfg. Co. Mr. Brown is also president of the Brown-Lipe Gear Co. and the H. H. Franklin Mfg. Co., and vice president of the Smith Premier Typewriter Co.

TRADE PUBLICATIONS.

The Berkshire Mfg. Co., Cleveland, is distributing a handsome catalog illustrating the Berkshire automatic molding machine. The machine is described and illustrated with half tones and the catalog also presents a number of examples of the work done on it.

The Ingersoll-Rand Co., New York, has just issued bulletin 2008 describing the "Imperial" motor hoist and stationary motor. This hoist is a pneumatically operated machine, ranging in capacity from 1,000 to 10,000 pounds. The "Imperial" motor is a small but powerful engine for intermittent services.

The Edwards Mfg. Co., Cincinnati, is distributing a most comprehensive and complete catalog describing sheet metal building material. The catalog comprises 170 9 x 12 pages and illustrates almost every possible product of sheet metal, including cornices, ridges, roofing, siding, bay windows, ventilators, piping, ceiling, etc.

The Waterbury-Farrel Foundry & Machine Co. is distributing catalog section A, illustrating "cold process," automatic, nut bolt and rivet machinery and reciprocating screw threaders. A large line of machines is illustrated, including single-stroke headers, double-stroke headers of various types, spoke headers, stove-rod headers, reciprocating screw-thread rolling machines, nut machines, trimming presses, riveting machines, etc. The catalog contains 75 six by nine pages, and illustrates and gives full specifications of all the machines.

The Ingersoll-Rand Co., N. Y., is distributing a catalog describing the "Little Jap" hammer drill. This is a compressed air operated machine for use in mining work.

The Whiting Foundry Equipment Co., Harvey, Ill., has issued catalogs Nos. 47 and 48, descriptive, respectively, of ladles and direct current Solenoid brakes. The first catalog lists foundry and steel works ladles of all descriptions from the smallest hand ladle up to 25-ton geared crane ladles. The Solenoid brake catalog contains the specifications of the brake, together with directions for setting and operating.

The Chicago Pneumatic Tool Co., Chicago, is distributing a catalog entitled "The Franklin Air Compressor," devoted exclusively to the compressors manufactured at its Franklin, Pa., plant. The book comprises 116 6 x 9 pages, containing illustrations with full detailed descriptive lists of over 100 sizes and styles of this compressor. A considerable number of constructive principles are described in detail, and useful information relative to new types of compressors, including Corliss and motor-driven compressors, and compressors of large capacity is given. Considerable space is devoted to pumping by compressed air, and numerous interesting tables and formulae are given.

The E. W. Bliss Co., Brooklyn, N. Y., has issued the 1906 edition of its catalog. This is a more pretentious book than the average trade catalog, and comprises 578 5½ x 7¼ pages, illustrating the complete line of presses, punches, shearing and kindred machinery manufactured by this company. It is bound in cloth, well printed and handsomely illustrated, and contains a vast amount of information concerning this type of machine. Presses for all services are illustrated, ranging in size from a small bench press to powerful toggle drawing presses, weighing 125,000 pounds. Every machine made by this company is illustrated. Full specifications and samples of the work done by them are given. In addition to the press and punch machinery, the catalog illustrates drop hammers, shears, slitting machines, seaming machines, trimming, beading, flanging machines, squeezers, automatic screw machines, smoothing rolls, furnaces, etc.

WAGE ADVANCES ANNOUNCED.

The Thanksgiving season was taken advantage of by several industrial concerns for the announcement of a wage increase. The Kilbourne & Jacobs Mfg. Co., Columbus, advanced its workmen 15 cents a day and the Grey Iron Co., Columbia, Pa., has announced a general increase of 10 per cent. The Yale & Towne Mfg. Co., Stamford, Conn., has made an advance involving an increase of about $75,000 in the 1907 pay roll, in addition to recent advances aggregating $54,000. About 1,000 employes of the Warren Fdy. & Machine Co., Phillipsburg, N. J., have received a 10 per cent increase.

Child Labor Bill.—Senator Beveridge, of Indiana, has prepared and will push a bill to prohibit carriers engaged in interstate from transporting or accepting for transportation the product of any mine or factory in which children under the age of 14 are employed. Concerns affected by the bill will be obliged to make affidavit twice a year to the effect that during the preceding six months they have employed no children under the prescribed age.

The Howe Scale Works, Rutland, Vt., was forced to close its foundry last week through the inability of the railroads to handle its supplies of fuel and iron.